Coal Age

Focusing Management Skills On Today's Problems

...p 54

AUGUST, 1954

A McGRAW-HILL PUBLICATION — PRICE 50c

for long term PROFITS

There's a stronger connection than ever between your haulage system and your long term profits! In fact, increasing costs have made maximum efficiency vital, if there are to be any profits at all!

That's just where ACF Mine Cars pay off! They provide a dependable, low cost and completely flexible haulage system. Simple and rugged in design, they can be easily repaired on-the-spot—no work stoppage! Special Drop-Bottom action permits unloading at the rate of a ton a second! They do double duty—haul men and supplies in, coal out!

This is the only kind of value that pays off in today's mining operations. Let your friendly ACF Representative give you the complete facts.
ACF Industries, Incorporated, New York • Chicago
St. Louis • Cleveland • Philadelphia • Huntington, W. Va.
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acf

MINE CARS

for Constant Haulage

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Photo courtesy United Electric Coal Companies, Chicago, Ill.

Chewing up the earth— 40 tons a minute

A typical example of B. F. Goodrich improvement in rubber

THAT machine strips overburden, exposing seams of coal that can then be mined. Huge buckets, bolted to the revolving wheel at left, bite into the earth, scoop it up and over onto a moving rubber belt that carries it away to be dumped.

But imagine the tearing jar on the belt from two-ton bucket loads of dirt and rock hitting it every few seconds, hour after hour. The banging and crashing would be enough to rip any ordinary belt to shreds.

Then a B. F. Goodrich man told the mine owner about the B. F. Goodrich *cord* belt. Cords, running lengthwise, are held in place by rubber. Under a sharp blow the cords can "give" temporarily, letting the rubber take the shock.

It was a new kind of belt—new, that is, 10 years ago when the belt was put to work on this job. Speed of strip mining increased 400%, the cost was lower because B. F. Goodrich had made improvements in a belt so it would stand rugged service like this.

Reducing costs for business is our business. Others may do it by cutting the original price. We do it by a constant program of improvement that results in products that stand harder use, last longer, and so cost far less when measured in terms of useful life. Don't be too sure that the service you are getting from belting, hose, tank linings or any rubber product is all you can expect until you learn what B. F. Goodrich has done recently to improve it. Call in your BFG distributor or write *The B. F. Goodrich Company, Dept. M-291, Akron 18, Ohio.*

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

The Power of a NAME is judged

Napoleon

No matter what you think of him, the name of "the little Corporal" still exerts a glamour over men's minds . . . it bespeaks destiny, glittering military glory, a rise from obscurity to the throne of an Emperor by sheer power of will and energy.

by ACCOMPLISHMENT

—and you can apply this yardstick to

LUBRICATION

for instance... take the name

Hulburt

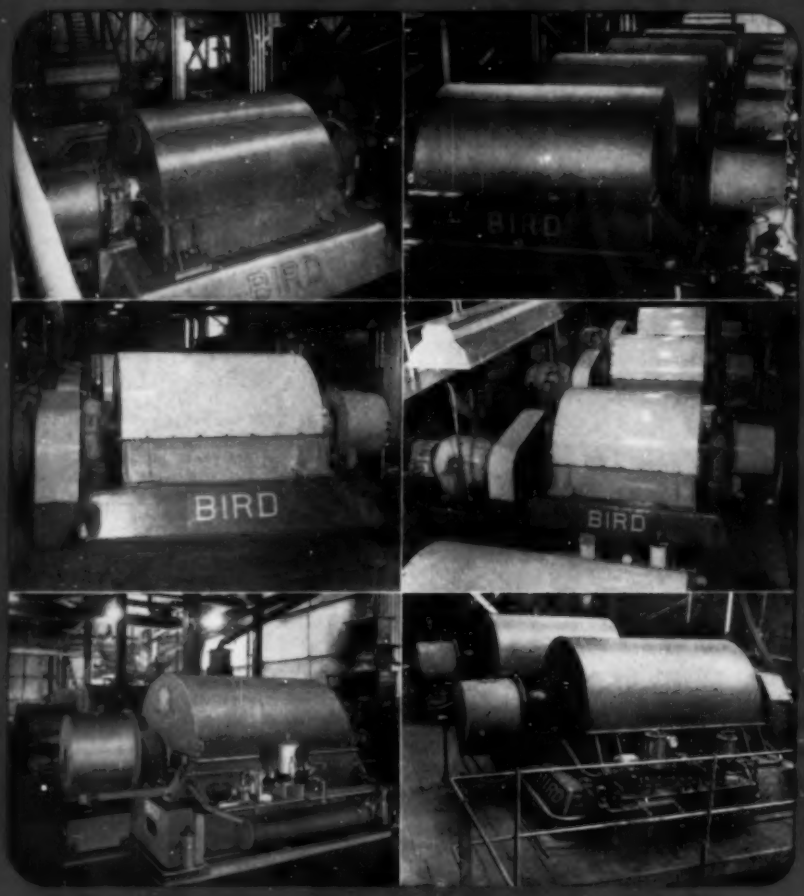
QUALITY LUBRICANTS

Judge the name HULBURT by what this famous Quality Lubricant does in the one and only field it is made for—and you have the explanation of its leadership in the proper lubrication of coal mining machinery. Yes—when you let a Hulburt Engineer conduct a campaign of lubrication investigation and recommendation down in your mine, and you attack the problem with Hulburt Quality Lubricants, your machinery operating costs go down, as friction meets its Waterloo.

HULBURT OIL & GREASE COMPANY, PHILADELPHIA, PA.

Specialists in Coal Mine Lubrication

THIS IS THE BEST WAY TO Dewater Fine Coal



It's also the low cost way in the long run

The BIRD COAL FILTER recovers all the fine coal and takes out the maximum amount of moisture. The feed to the Bird doesn't have to be screened.

When the coal contains an excessive proportion of fine slimes, the Bird removes them by a simple rinsing operation. These slimes can retain as much as 50% of the total moisture content of the coal. Only the Bird takes them out.

The Bird runs continuously day in and day out — none of those frequent shutdowns for repairs or screen replacements.

The Bird costs as little as five cents per ton to operate, and two cents or less per ton to maintain.

These statements are based on actual performance in a large number and variety of coal preparation plants.

May we show you what the Bird Coal Filter will do and how it will work for *you?*

BIRD MACHINE COMPANY

SOUTH WALPOLE. • MASSACHUSETTS

Coal Age

AUGUST • 1954

Editorials: Total Selling; Air and Water 53

Better Management Today—W. A. STANBURY JR. 54

42 Years in Coal Stripping—R. H. SHERWOOD 60

Pioneering at New Stripping—A. E. FLOWERS 64

No. 12 Alma Mine—J. H. EDWARDS 70

Architecture in Coal Mining 76

Cleaning Anthracite Completely 78

Freeman Teams High Output, Quality Preparation ... 82

Power Distribution for AC Mining—R. G. GEHLSEN 88

Foremen's Forum: Integrated Supervision 92

Operating Ideas: Shunt Device Boosts Safety 96

Drive Permits Use of More Economical Belt ... 96

Do's and Don't's of Hose Couplings 98

Chute Control Smooths Belt Loading 98

A Simple Valve 98

Equipment News and Bulletins 100 *News Round-up* 115

Cutting Supply Cost

INVENTORY CONTROL, control systems, use records, allocation of stocks, storage and handling, special supply houses, supply delivery, and preventing waste and loss are the major sections in the *Coal Age* special report on cutting supply cost scheduled for the September issue. The 13th in the *Coal Age* Cost-Cutting Series, this special report, like all its predecessors, will get down to brass tacks on how to buy, store, handle and distribute supplies for minimum supply cost and maximum contribution to production efficiency.

Proved by Experience

How Modern Methods, Effective Management and Creative Thinking Are Teamed up to Mine 14,500 TPD, also scheduled for September, is a detailed description of methods and equipment at No. 10 mine of the Peabody Coal Co. where, among other things, section crews average 800 to 900 tons per shift. The article will include 14 down-to-earth Operating Ideas developed at No. 10 and ranging from metal stoppings to a crawler-mounted hoist for moving equipment and recovering steel timbers.

Close-Coupled Strip Mining Demands Careful Planning, another feature for September, tells how Buckeye Coal Co. organizes to permit loading not longer than 24 hr after stripping. Eight separate ideas for increasing overall stripping efficiency are featured in the article.

High Tons in Low Coal, likewise scheduled for the September issue of *Coal Age* shows how Stephens-Elkhorn gets up to 25 tons per man in 30- to 36-in. coal, conveyor moves included, using loading machines and bridge conveyors, with creative management sparking the operation.

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You'll realize, too, a saving in maintenance costs. *Texaco Olympian Grease* resists oxidation and separation . . . stays *in* the bearings . . . seals out dirt and moisture . . . wards off wear. There are three consistencies of *Texaco Olympian Grease* to meet all requirements of plain, cavity hub and anti-friction bearings.

For high-speed, grease-lubricated ball and roller bearings use premium-quality *Texaco Regal Starfak*. It assures longer lasting protection against wear and rust . . . reduces maintenance costs.

A Texaco Lubrication Engineer will gladly help you get the most out of your equipment, above and below ground. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

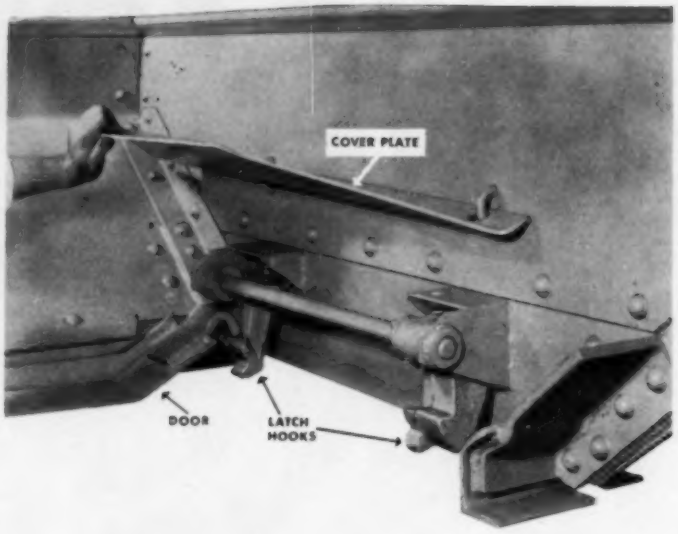
TEXACO

LUBRICANTS for the Coal Mining Industry

"Twin Safety Latches" on S-D Automatic Cars PREVENT DOORS OPENING ACCIDENTALLY!

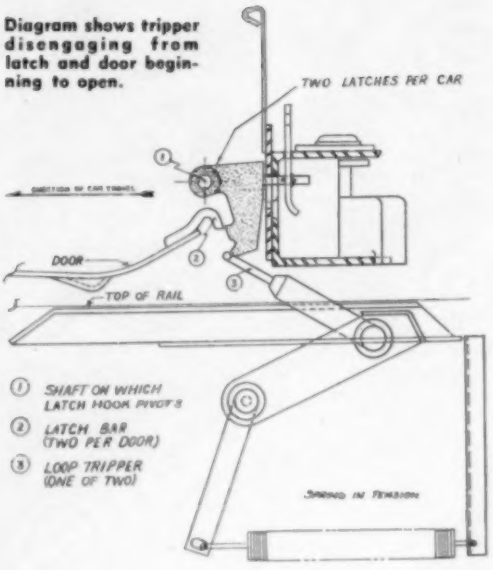
S-D AUTOMATIC CAR DOORS open only when exclusive "Twin Safety Latches" are tripped simultaneously. This means that if one latch is tripped independently, the other latch will continue to support the door. The simultaneous unlatching can be accomplished *only by the independently operated pair of tripping devices* mounted between rails. These "Twin Safety Latches" act as two padlocks for safe and sure latching . . . preventing doors opening accidentally anywhere along the haulage route. The cutaway view at right shows the "Twin Safety Latches" with cover plate raised. The drawing below photo illustrates how each tripping device between the rails unlocks the doors while the trip is moving over the bin.

Other important features offered only by S-D Automatics include: (1) from a quarter to half-ton greater capacity for any overall dimension and (2) the only automatic dumping car completely sealed against dust leakage. This big improvement gives you safer operation by preventing leakage of dust and enables you to eliminate the major portion of track clean-up costs. For complete information write us today. *Sanford-Day Iron Works, Inc., P. O. Box 1511, Knoxville, Tenn. Telephone 3-4191.*



Cross-section view in photo above shows position of each hook when locked by one of the "Twin Safety Latches". Detail drawing at right illustrates how each independently operated tripping device mounted between rails engages "Twin Safety Latches" and unlocks doors. Each latch is completely protected by the body structure from obstructions lying along roadway. In the diagramatic drawing you see that no part of latch casting extends below the door or insill. For this reason, a rock, timber or lump of coal lying between rails cannot accidently trip either of the "Twin Safety Latches". This can only be done by the special tripping device mounted at the bin.

Diagram shows tripper disengaging from latch and door beginning to open.


TWO LATCHES PER CAR
DOOR
TOP OF RAIL
1 SHAFT ON WHICH LATCH HOOK PIVOTS
2 LATCH BAR (TWO PER DOOR)
3 LOOP TRIPPER (ONE OF TWO)
SPRING IN TENSION

Sanford-Day IRON WORKS

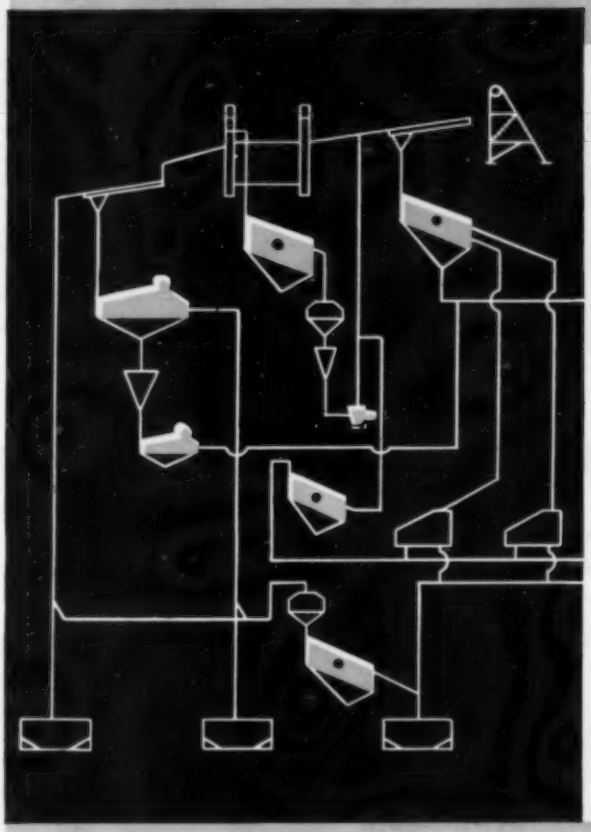
KNOXVILLE • TENNESSEE

BROWN-FAYRO DIVISION
JOHNSTOWN, PA.

MINE CARS, All Types - PRECISION WHEELS - "Brownie" HOISTS CAR RETARDERS - SPOTTERS PUMPS - OIL SPRAY SYSTEMS

FOR Profitable COAL PREPARATION

ALLIS-CHALMERS Vibrating SCREENS



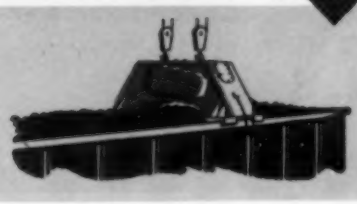
- for sizing ROM coal.
- for dry sizing raw coal ahead of cleaning units.
- for sizing and dewatering coarse coal after cleaning units.
- for sizing moist fine coal.
- for wet sizing raw coal ahead of cleaning units.
- for dewatering refuse after cleaning units.
- for media recovery after heavy media cleaning units.
- for dewatering fine coal after cleaning units.
- for sizing washed and crushed coal.
- for dewatering sludge — solids recovery.
- for sizing fine coal after dry cleaning units.

More Allis-Chalmers vibrating screens are used in the coal industry than any other make! Operators find it *profitable* to specify screens from the broad range of types and sizes offered by Allis-Chalmers because they can match the screen to the job. All of these screens have been specifically engineered for a special job in coal preparation. Be sure to send for new Vibrating Screen Selection Guide, Bulletin 25C6280E. Get it from your Allis-Chalmers representative in your area or write to Allis-Chalmers, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

With the Allis-Chalmers Car Shaker, you can ... unload a hopper bottom car of coal in as little as two minutes ... resulting in big savings in man-hours and unloading costs. Motor and drive are totally enclosed within shaker body, protected from damage and weather. Send for Bulletin 07B7221.

A-4241



HEFTY A scooter waits for clearance to take the turnout at Jamison Mine No. 9. Haulage system is laid with 85-lb Bethlehem rail throughout. Bethlehem also prefabricated the turnouts of 85-lb rail sections. This is one of the heaviest mine track systems ever built, and it will stand up for a long, long time.

BIG This 17-ton mine car is just about as big as they come. There are 150 of them at Jamison Mine No. 9. The cars are eight-wheelers with cast-steel high-speed trucks and automatic couplers. Bodies are all-welded construction. These rugged giants can really haul the tonnage.

SAFE (*Below*) Jamison Mine No. 9 uses Bethlehem Mine Roof Bolts throughout for safety and greater operating efficiency. Absence of timbers permits maximum clearance for mobile equipment. These are headed bolts, spaced on 4 ft centers, and used with square roof plates. Mine also uses Bethlehem slotted roof bolts.

Tomorrow is Here Today

LAST WORD IN HAULAGE SYSTEMS

at Jamison Mine No. 9

ALMOST ENTIRELY BETHLEHEM-EQUIPPED

They've really built themselves a haulage system at Jamison Mine No. 9, Farmington, W. Va. They went all out to make this mine a completely automatic system. It is now so efficient that they have been able to make a substantial reduction in haulage costs.

To see what they've done, lets start with a look at the new track. It's laid with Bethlehem 85-lb rail, which is plenty heavy enough to carry the loads—big loads—for many years to come. Certainly an important step in lowering operating and maintenance costs.

Next, the cars. They're Bethlehem, too—big 17-ton giants with cast-steel high-speed trucks and automatic couplers. These cars are among the first to be equipped with railroad-type rubber-draft-gear coupler assemblies. In addition, the mine also uses Bethlehem double-truck hopper-type ballast cars.

Overhead, this progressive mine is on a 100 pct roof-bolting program, using Bethlehem bolts in both headed and slotted types. Bethlehem roof bolts add to safety at Jamison Mine No. 9 by clamping several layers of strata into a single, thick beam, thereby minimizing the threat of roof falls. They also eliminate space-consuming timber supports, allowing wider clearances, greater freedom in operating mechanized equipment, and improving ventilation.

Jamison Mine No. 9 is a prime example of what can be done to widen the gap between the cost of mining and the selling price of coal.

Bethlehem stands ready to work with you on any rehabilitation program you might have in mind. Our engineers are thoroughly experienced in the problems of mine haulage, and they can be reached through the nearest Bethlehem sales office. A phone call or letter from you will start things moving.

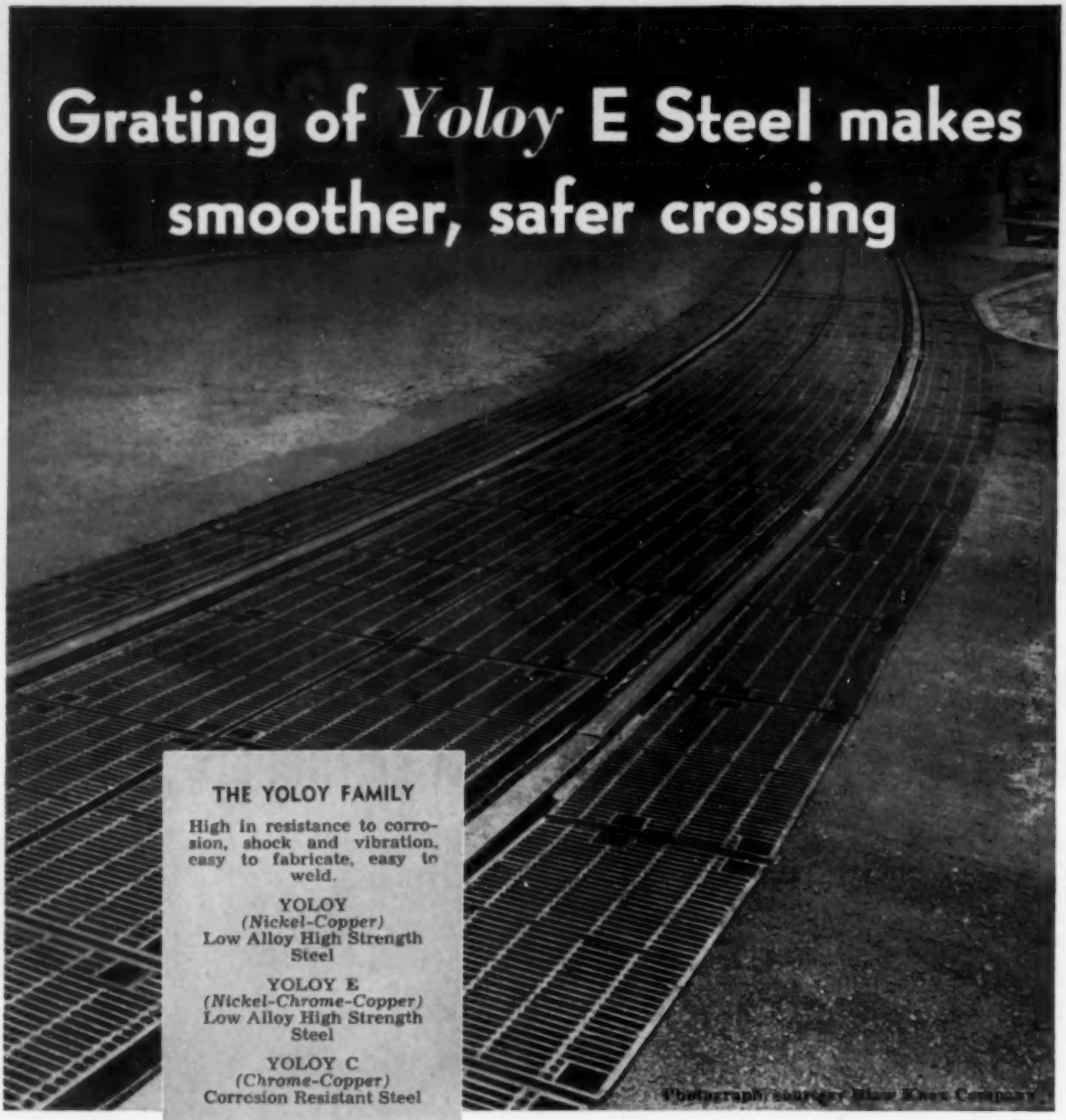
SUPPLY LINE Cars bearing supplies for the underground workings are eased down a slope at Jamison No. 9 by means of wire rope. Then the empties are hauled to the surface for another load. The rope is Purple Strand (Bethlehem's strongest and toughest), Seale construction, 1⅛-in. diam. It is a workhorse that has easily met every demand.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation.
Export Distributor: Bethlehem Steel Export Corporation

Grating of *Yoloy* E Steel makes smoother, safer crossing



THE YOLOY FAMILY

High in resistance to corrosion, shock and vibration, easy to fabricate, easy to weld.

YOLOY
(Nickel-Copper)
Low Alloy High Strength Steel

YOLOY E
(Nickel-Chrome-Copper)
Low Alloy High Strength Steel

YOLOY C
(Chrome-Copper)
Corrosion Resistant Steel

Photograph courtesy Blaw Knox Company

Youngstown

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●Crossings of Yoloy E "Electro-forged"* steel grating provide a sure means to increased safety and improved appearance of railroad property - an investment that promotes public good will. For full data on the Yoloy family of steels phone or write our nearest District Sales Office.

*Registered—Blaw Knox Company

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices: Youngstown, Ohio - Export Office: 500 Fifth Avenue, New York 36, N. Y.

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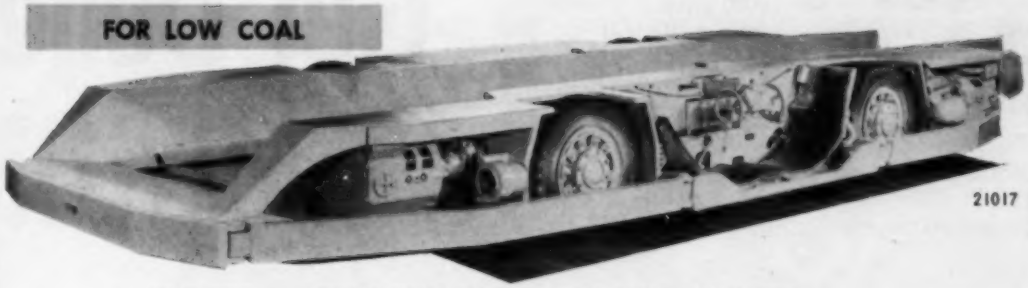
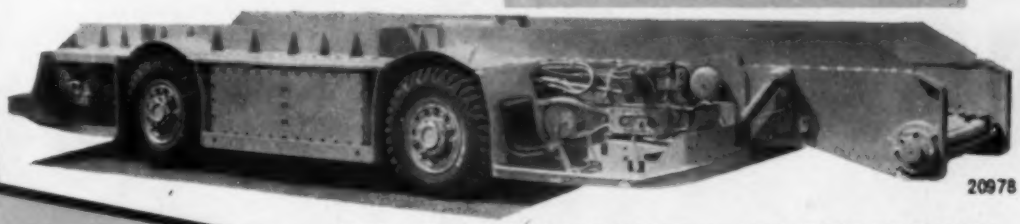
2 more have been added to the line of Goodman SHUTTLE CARS

FOR LOW COAL



TYPE 870 • BASIC HEIGHT 26" • AJDUSTABLE DISCHARGE

FOR INTERMEDIATE HEIGHT COAL



TYPE 670 • BASIC HEIGHT 32" • ADJUSTABLE DISCHARGE

GOODMAN SHUTTLE CARS ARE NOTED FOR:

- *high capacity to handle surge loads*
- *speed for quick-trip transfer of loads*
- *maneuverability that accelerates productive work*
- *ruggedness that promotes continuous service*

All, of course, feature 4-wheel drive, 4-wheel steering, 4-wheel brakes, hydraulic-controlled cable reel, extra strong conveyor chain, one- or two-speed chain drive, dual controls in operator's cab, specially designed motors, safe electrical control, U. S. Bureau of Mines approved.

Goodman
MANUFACTURING COMPANY
Halsted Street and 48th Place • Chicago 9, Illinois

OTHER CABLE REEL CARS IN THE COMPLETE GOODMAN LINE:

Type 580, basic height 42", adjustable discharge
Type 582, basic height 42", fixed discharge
Type 570, basic height 48", adjustable discharge

Cutting Machines · Conveyors · Loaders · Shuttle Cars · Locomotives · Continuous Miners

TO LICK the really rough ones *on schedule*, mount U. S. Royal Nylon Con-Trak-Tors on your equipment.

ALL-NYLON STRENGTH

The Con-Trak-Tor's Nylon cord carcass *won't quit* under vicious shocks and jolts. You're sure to get all the long service life built into this great tire.

TRIPLE IMPACT PROTECTION

1. *Extra rubber* between cord plies. 2. *Double shock-pads* beneath the tread. 3. *Built extra-tough at the crown* to withstand snags and rocks.

FULL LUG TRACTION

The Con-Trak-Tor's *full-width* lug design pulls you through where others bog down, won't strand you in heavy going, gives *extra* protection from side-slip.

Talk the Con-Trak-Tor over with your U. S. Royal Dealer. He can equip you with the size you need for the job you want to get done!

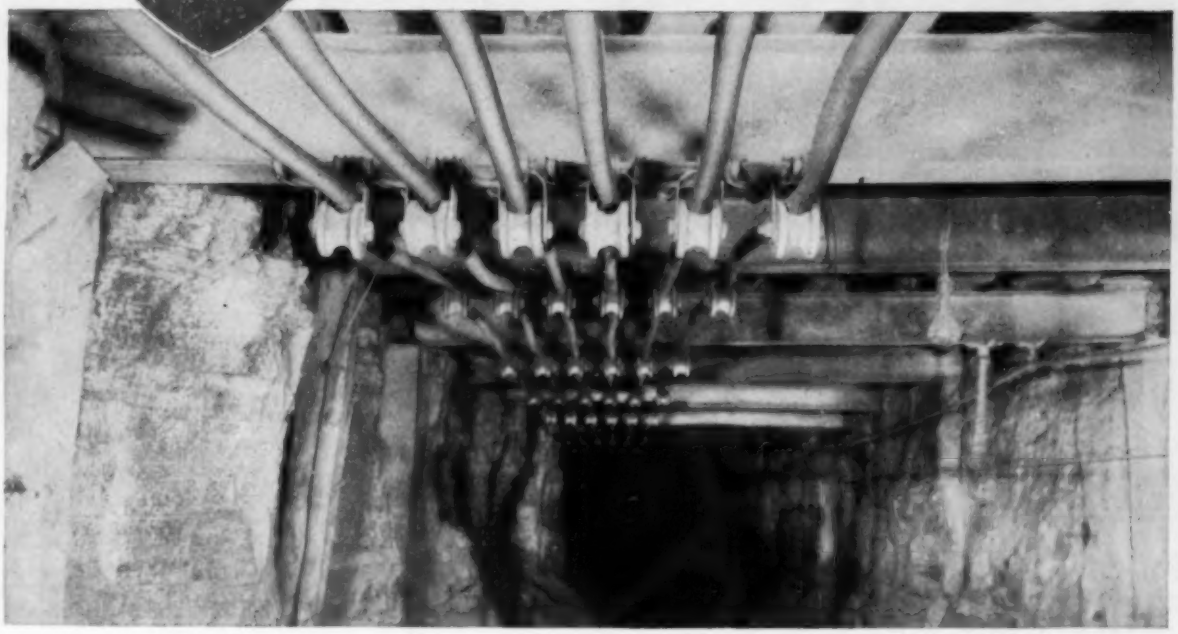
Tough Jobs Get Done ...on NYLON!

U.S. ROYAL

CON-TRAK-TOR
FULL LUG

US RUBBER UNITED STATES RUBBER COMPANY

ARTERIES FOR YOUR MINE MOTORS



Today more electric motors are used in mining than at any time in history. Consequently, the importance of mine feeder cables was never greater. In terms of money, man hours and production, these cables must be the most dependable money can buy. The whole mine depends on them.

Anhydrex-insulated mine feeder cables laugh at water and its harmful effects. They thus assure mining motors a continuous supply of electricity.

ANHYDREX Cables are used in wet locations without the protection of a lead sheath. They are easier to put up or take down and re-use than lead-sheathed cable. Splicing is simpler, faster and cheaper. There's no electrolysis because there's no metallic sheath.

Anhydrex-insulated, neoprene-jacketed mine feeder cables can be hung from the roof or, if conditions permit, they may be buried in the gob. To find out more about Simplex-ANHYDREX Power Cables, ask for the Simplex Mining Cable Catalog No. 1008.

Simplex–ANHYDREX Power Cables

SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Mass.

BOTTOM DECK of a dewatering screen with ½" x 3" openings is 8 and 12 gage Stainless wire. It has been in service since the plant opened while carbon steel on the top deck is replaced every six months.

HANDLING ALL THE COAL processed in the plant, this Stainless dewatering screen—⅜" wire with ½" openings—has been in service without maintenance since the plant opened.

No maintenance needed since April 1953 . . .

these screens are Stainless Steel

ROSEDALE COAL COMPANY, Morgantown, W. Va. opened a new preparation plant at its No. 1 mine in April 1953. To assure maximum screen life and keep operation free from interruptions, Stainless Steel screens were used in the spots where trouble most often appears.

The results to date are outstanding. F. O. Johnson, Vice-President of Operations, says, "Our Stainless installations have required no maintenance whatsoever since the plant began operating."

Working conditions are tough. The dewatering screen ahead of the Hydro machine handles 7500 tons of 4" to 0 coal a week. The Stainless wire screen has required no maintenance. Stainless perforated plate on the air cleaning table handles an equal amount of coal with the same performance. The bottom deck of the Hydro separator and dewatering screen handles 375 tons of wet coal daily. It has given uninterrupted service while the top deck of carbon steel has been replaced every six months. And the screen on the sludge conveyor has worked around the clock without replacement.

"There's no question," Mr. Johnson says, "that Stainless Steel is the best material to use in cleaning plant trouble spots."

And when you use Stainless, there's no question that perfected, service-tested USS Stainless Steel will give you the finest performance.

UNITED STATES STEEL CORPORATION, PITTSBURGH · AMERICAN STEEL & WIRE DIVISION, CLEVELAND
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TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

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SHEETS · STRIP · PLATES
BARS · BILLETS

USS

PIPE · TUBES · WIRE
SPECIAL SECTIONS

4-1606

UNITED STATES STEEL

FASTER DEWATERING OF COAL FINES ON AGIDISC FILTERS

This filter produces about 35 tons dry cake per hour and does not run to capacity.

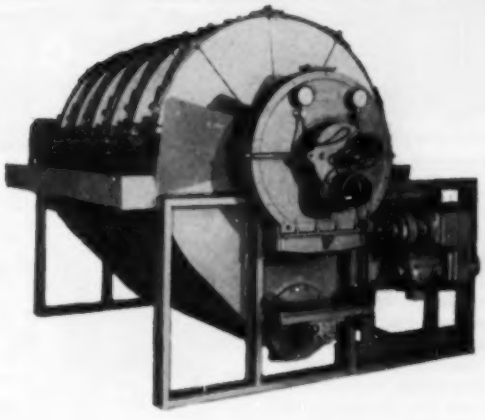
Close up of cake at discharge not retouched.

More tons per square foot of filter area and less moisture content in the cake are two of the features which make Eimco Agidisc filters superior in the fine coal dewatering business.

Hidden values in the Eimco filter are just as important as those that are obvious. Eimco filters are heavier, better designed units for long years of trouble-free operation. They require less maintenance and provide lower operating costs.

Eimco filters will produce a filtrate clear enough to satisfy any polution standards.

Our Research and Development Division is continuing its fine coal research. Let us apply this information to your fine coal dewatering problem.



Eimco Agid.sc filter with meta' cloth bags.

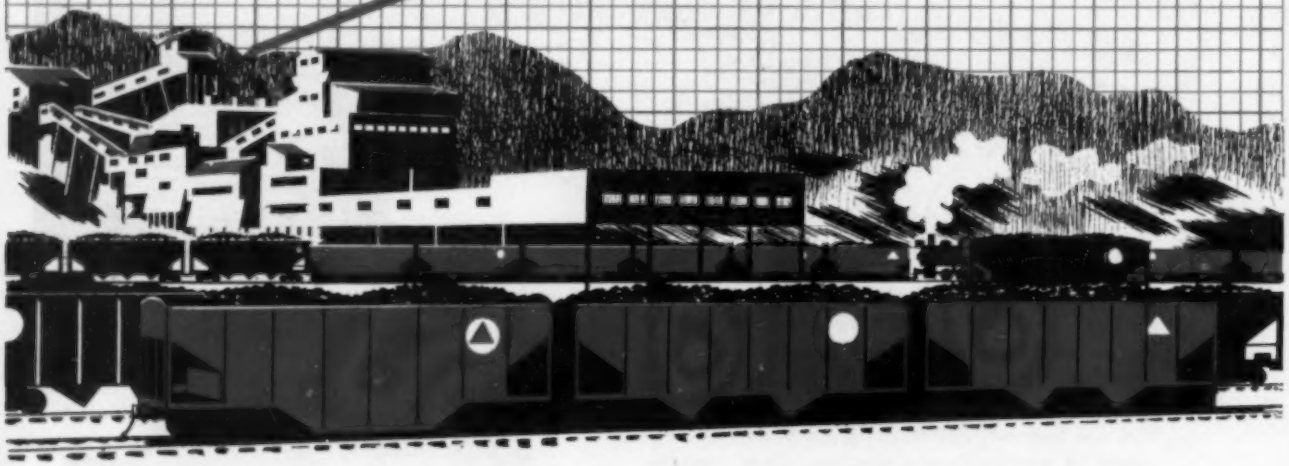
THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

New York, N. Y. Chicago, Ill. San Francisco, Calif. El Paso, Texas Birmingham, Ala. Duluth, Minn. Kellogg, Ida. London, Eng. Paris, France Milan, Italy

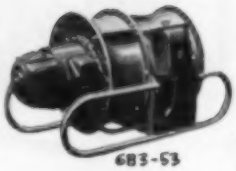
You Can't Beat An Eimco

coal production goes up, up, up with JEFFREY mine equipment



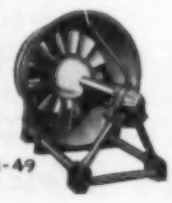
BLOWERS

Fresh air helps miners increase production. Lightweight, low-height Jeffrey blowers move air efficiently through tubing for auxiliary ventilation to sweep working faces in rooms or hard-to-reach places. Compact, portable.



AERODYNE FANS

Proper ventilation brings healthier, safer conditions underground, and more coal is mined. AERODYNE Fans deliver maximum air flow economically and with low maintenance.



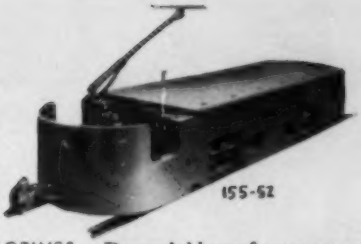
The finest coal mining equipment in the world —that's why production at Jeffrey-equipped mines goes *up* and *up*.

Jeffrey offers a complete line from face to tipple . . . the best engineering research and development available . . . 77 years of world-wide mining experience . . . sales and service from strategically located district offices and warehouses.

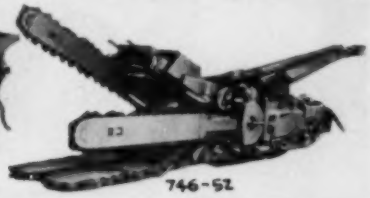
Read about the equipment illustrated here. Then telephone or write your nearest Jeffrey district office.* Find out how Jeffrey mine equipment can make *your* coal production go *up* and *up*.

*Beckley • Birmingham • Chicago • Denver • Harlan • Pittsburgh • Salt Lake City

SHUTTLE CARS — Three rugged models — MT66, MT67, MT68 — in 24" to 54" basic heights. Their speed, high capacity and easy steering save time from loader to main haulage system . . . increase loading efficiency . . . cut mining costs.



LOCOMOTIVES — Dependable performance makes Jeffrey locomotives the coal industry's production workhorses. Rugged overall design and improved features assure low maintenance and high tonnage.

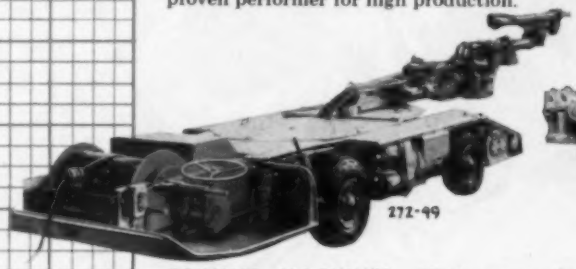


UNIVERSAL CUTTERS — The extremely maneuverable 70-UR will make any desired cut in coal seam. Quick, positive and accurate response saves time, results in greater tonnage per man-day. A proven performer for high production.

CONTINUOUS MINING MACHINES

COLMOL **(left)** — Produces 35 to 80 tons per man-shift, depending on mine conditions. High capacity of powerful, rugged, compact COLMOL means low mining cost per ton. Low and medium-high types for seams 38" to 72".

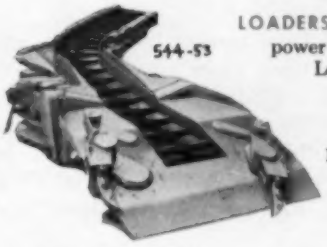
34-F (above) — Fast, flexible and field-proven, the patented 34-F mines high tonnage per man, month-in month-out. With a crew of 3 or 4, the 34-F consistently averages 165 tons per shift. Reliable production plus rock-bottom maintenance. Four models for coal 56" to 108".



DRILLING MACHINES — Wide range of adjustment on 56-FHR means peak flexibility for drilling in any position, giving fast and easy shot hole placement. Completely hydraulic in operation.

ROOF DRILLING MACHINES — Fully hydraulic operation gives 56-RDR speed and quick response. Easily adaptable to mine production cycle. Hydraulic torque wrench assures predetermined, uniform, accurate bolt tightening.

BELT CONVEYORS — No delays when large coal tonnages are handled with Jeffrey sectional belt conveyors. Designed for belt widths 26" to 48", they give continuous haulage for gathering or main line transportation. Light, medium and heavy duty types.



LOADERS — Total punch of 64 horsepower provides the 81-A Crawler-Loader with ample power for the toughest loading jobs. Rated capacity is 8 TPM; maximum capacity is 10 TPM. Peak performance and low maintenance make the 81-A today's best loader buy.

THE JEFFREY MANUFACTURING CO.

ESTABLISHED 1877

Columbus 16, Ohio

sales offices and distributors in principal cities

PLANTS IN CANADA, ENGLAND, SOUTH AFRICA

IF IT'S MINED, PROCESSED OR MOVED . . . IT'S A JOB FOR JEFFREY!

EASY TO INSTALL? I'LL SAY!

It's a Tigerweld BF-10 Rail Bond

• Bing, bang, bong! Three hammer blows, and the terminal is on the track. *There it stays* while you make your weld—a solid steel-to-steel weld that really holds.

Everything about this bond is rugged. The terminals are made of tough, heavy steel that can take punishment. And they are butt-welded to the strand for permanence. You can reclaim this bond and use it over again—many times.

Remember, too: this Tigerweld BF-10 is *reversible*. You can install it on top of the rail base. Or you can flop it so that the strand is under the base, safe from dragging equipment.

Write for more details.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

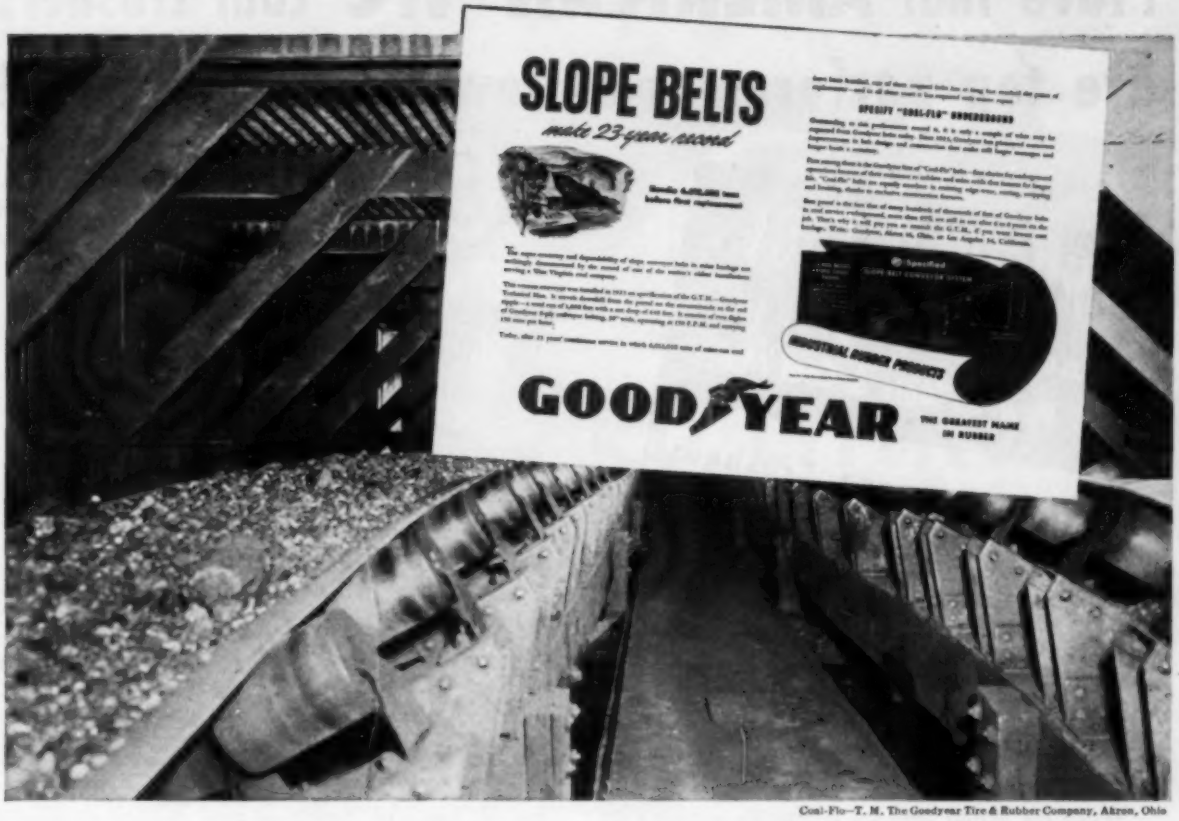
USS Tigerweld Rail Bonds

USS

UNITED STATES STEEL

GOODYEAR QUALITY PAYS OFF AGAIN:

A RECORD BREAKER IN 1946 —



Coal-Flo—T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

and still going strong

IN 1946, this conveyor smashed all records for length of service. It hauled over 6,000,000 tons of soft coal in *23* years of continuous operation. Today, over 75% of the original belt is still on the job with more than 10,000,000 tons in over *30* years behind it and many more tons and years to go.

Records like this are a major reason why Coal-Flo, as specified by the G.T.M.—Goodyear Technical Man—is your best belt buy. Your G.T.M. can give you all the facts and figures you need to justify your specifying and buying Coal-Flo. You can contact him through your Goodyear Distributor or by writing Goodyear, Industrial Products Division, Akron 16, Ohio. • • •

YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing or Rolls. Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

GOODYEAR

THE GREATEST NAME IN RUBBER

We think you'll like THE GOODYEAR TELEVISION PLAYHOUSE—every other Sunday—NBC TV Network

Actual Figures...*NOT Claims*

Prove that AMERICAN "WC" coal crushers are top performers at low operating costs!

CRUSHING FACTS

based on User-Reports from 12 Power Plants & Coal Mines

Total Tonnage Crushed:
1,507,827 tons

Parts Replacement Cost:
$0.0028 per ton

When the actual tonnage figures (as supplied by the Chief Engineers of power plants and the Preparation Engineers of coal mines) are compared with the total cost of replacement parts ordered, the real story of the quality and efficiency of American "WC" Coal Crushers is apparent—the story given in the panel above.

With American, quality is not a mere claim, nor even an isolated performance story. It is based on the consistent pattern of high-tonnage-at-low-maintenance for *all types* of American coal crushers—a record directly traceable to the efficient crushing action of the American-originated rolling-ring crushing principle, plus a half century of specialized experience in building coal crushers.

American "WC's" are designed for capacities up to 90 tons per hour . . . but whether your requirements range from coal sampling up to 600 tons or more per hour, American has the crusher to handle your job at the lowest possible cost.

. . . and for low-cost coal sample crushing

Model 9-9 American Laboratory Crusher, one of several sizes for reducing coal samples prior to analysis.

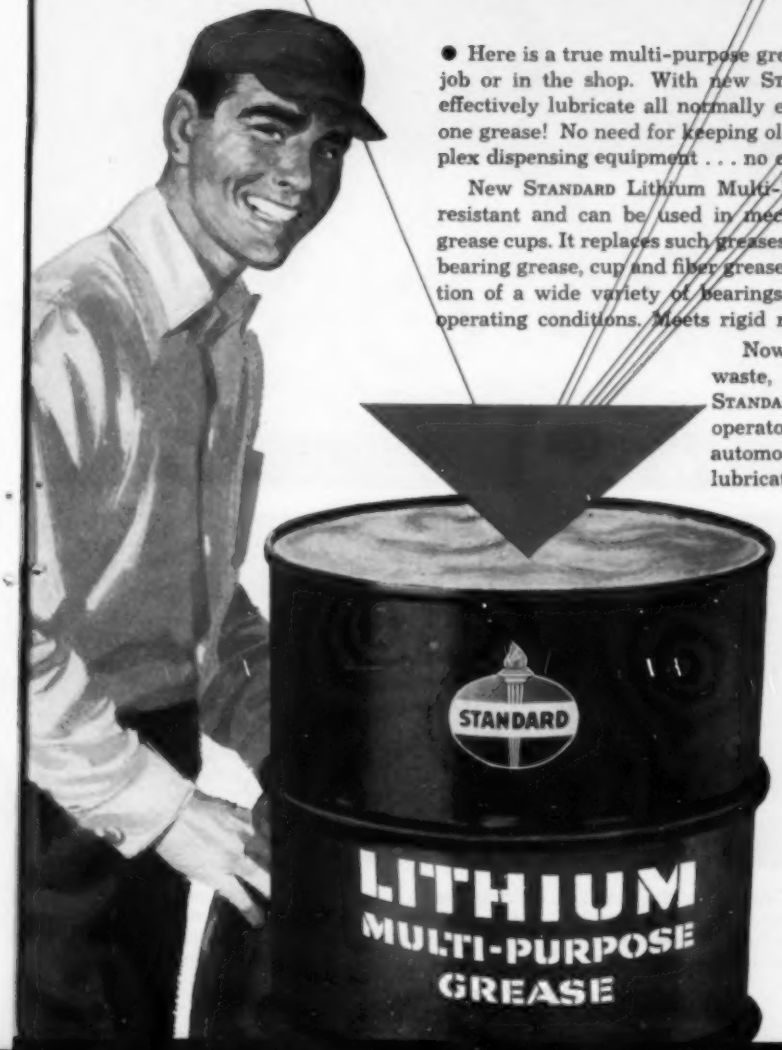
American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1119 Macklind Ave., St. Louis 10, Mo.

now 1 grease replaces 7

NEW STANDARD LITHIUM MULTI-PURPOSE GREASE



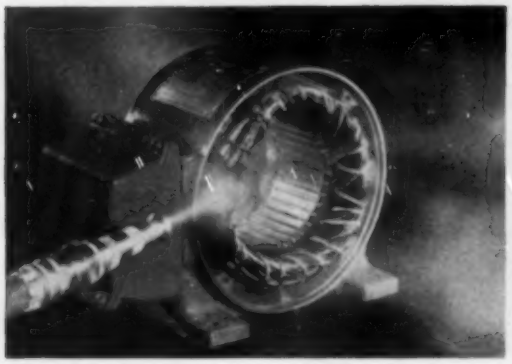
● Here is a true multi-purpose grease that can be *used practically anywhere* on the job or in the shop. With new STANDARD Lithium Multi-Purpose Grease you can effectively lubricate all normally encountered grease-lubricated bearings with just one grease! No need for keeping old-fashioned special-grease inventories with complex dispensing equipment . . . no chance of costly application mistakes.

New STANDARD Lithium Multi-Purpose Grease is water and high-temperature resistant and can be used in mechanically and hand-operated dispensers and in grease cups. It replaces such greases as viscous lubricants, water pump grease, wheel-bearing grease, cup and fiber greases and can be used for general chassis and lubrication of a wide variety of bearings—ball, roller, plain, needle—under wet and hot operating conditions. Meets rigid requirements of wheel bearing manufacturers.

Now you can reduce grease inventories, eliminate waste, do away with costly application errors with STANDARD Lithium Multi-Purpose Grease. Ideal for fleet operators, contractors, other large-scale users of heavy automotive equipment. Call your nearby Standard Oil lubrication specialist now.

STANDARD

STANDARD OIL COMPANY *(Indiana)*



Here's a Life-Line "A" stator that has been given multiple dips and bakes of Bondite. There is no evidence of vapor penetration after being exposed to the toughest insulation test—a jet of steam.

Try tearing a piece of Life-Line's slot insulation, Mylar®. Mechanical strength is eight times greater than ordinary slot cells. Dielectric strength is ten times greater than standard design requirements.

®Trade Mark for DuPont polyester film

There's more to motor insulation than its ability to repel water

These demonstrations show how new Life-Line A insulating materials provide greater protection for wire, slots and complete stator.

New and improved motor insulations are the word of the day. Actually, there is a considerable range between the run-of-the-mill "improved" insulations and the really outstanding types now available. There is only one way to judge them—by comparison.

For example, many new stator insulations do a more effective job of shedding water. But Life-Line's® new Bondite goes a step further . . . it repels vapors that penetrate ordinary water-shedding insulations.

The secret is in the silicone additive that is impregnated throughout Bondite instead of being just applied as a thin outer layer. The complete story of Life-Line's Bondite, Bondar and other new motor improvements is contained in the new Life-Line Booklet B-6154. For your copy, write: Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa. J-21847-A

YOU CAN BE SURE...IF IT'S Westinghouse

A duck's ability to shed water is only feather deep. A simple wetting agent dissolves the duck's protective coating and he sinks. Many water-shedding motor insulations react much the same; expose them to a simple solvent and they deteriorate.

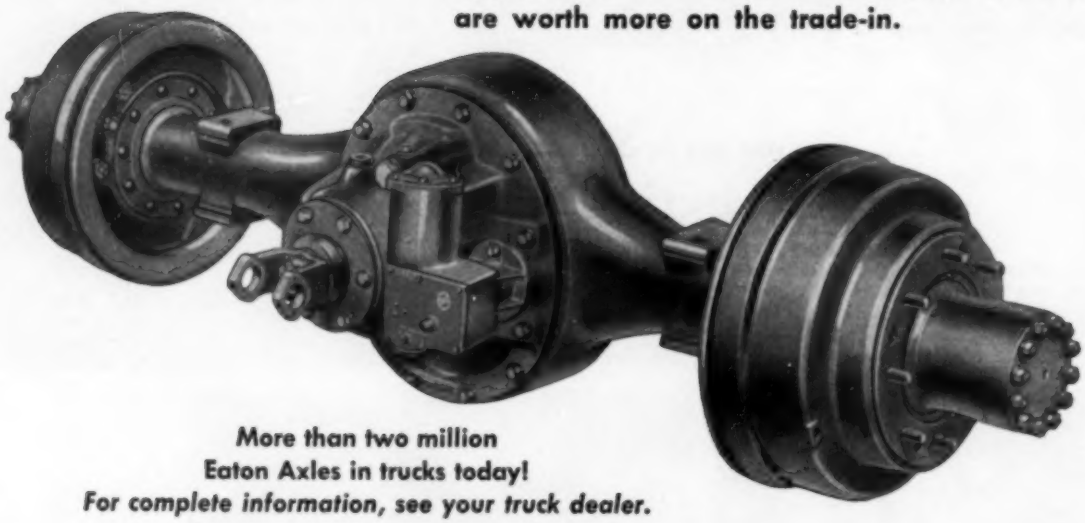
These two coils have been baked for 50 hours at 400° F. Bent around a finger, the ordinary insulation on the right coil flaked off. Life-Line's Bondar insulation on the left remained intact.

Dependable performance takes balanced design. That's why *every* component in the new Life-Line "A" has been redesigned and integrated with the whole. The result is a motor with superior performance.

Eaton 2-Speed Axles

SAVE MONEY MAKE MONEY for Truck Operators

Eaton 2-Speed Axle trucks make more and quicker full-load trips—operating cost is lower, upkeep is less. Trucks last longer, earn more, are worth more on the trade-in.



More than two million Eaton Axles in trucks today!
For complete information, see your truck dealer.

EATON — AXLE DIVISION — MANUFACTURING COMPANY
CLEVELAND, OHIO

PRODUCTS: Sodium Cooled, Poppet, and Free Valves • Tappets • Hydraulic Valve Lifters • Valve Seat Inserts • Jet Engine Parts • Rotor Pumps • Motor Truck Axles • Permanent Mold Gray Iron Castings • Heater-Defroster Units • Snap Rings Springtites • Spring Washers • Cold Drawn Steel • Stampings • Leaf and Coil Springs • Dynamatic Drives, Brakes, Dynamometers

8 YEARS AT HARD LABOR and this neoprene conveyor belt is still going strong. It's one of five neoprene belts at the Dorrance Colliery of the West Virginia Coal and Coke Company. These belts, totaling 3,656 feet in all, handle 10,000 tons of coal daily at this processing plant. They're exposed to grease, lubricating oils, sunlight, weathering, and constant abrasion from the coal. But conveyor belts of neoprene can take this brutal punishment without softening, cracking, or tearing. They can be counted on to keep giving dependable service for years to come.

Next time you order conveyor belting, specify neoprene—the same tough material used to jacket mine trailing cable. Neoprene offers you outstanding ***resistance to oils and grease, sun and weather, heat and flame.*** You get long belt life, big savings on replacement costs.

Keep abreast of the latest neoprene developments . . . mail the coupon below today!

NEOPRENE

The rubber made by Du Pont since 1932

DU PONT

REG. U. S. PAT. OFF.

Better Things for Better Living . . . through Chemistry

FREE! THE NEOPRENE NOTEBOOK

Every issue contains new illustrated case histories, interesting articles, new applications of neoprene. Clip and mail this coupon to E. I. du Pont de Nemours & Co. (Inc.), Rubber Chemicals Division CO-8, Wilmington 98, Del.

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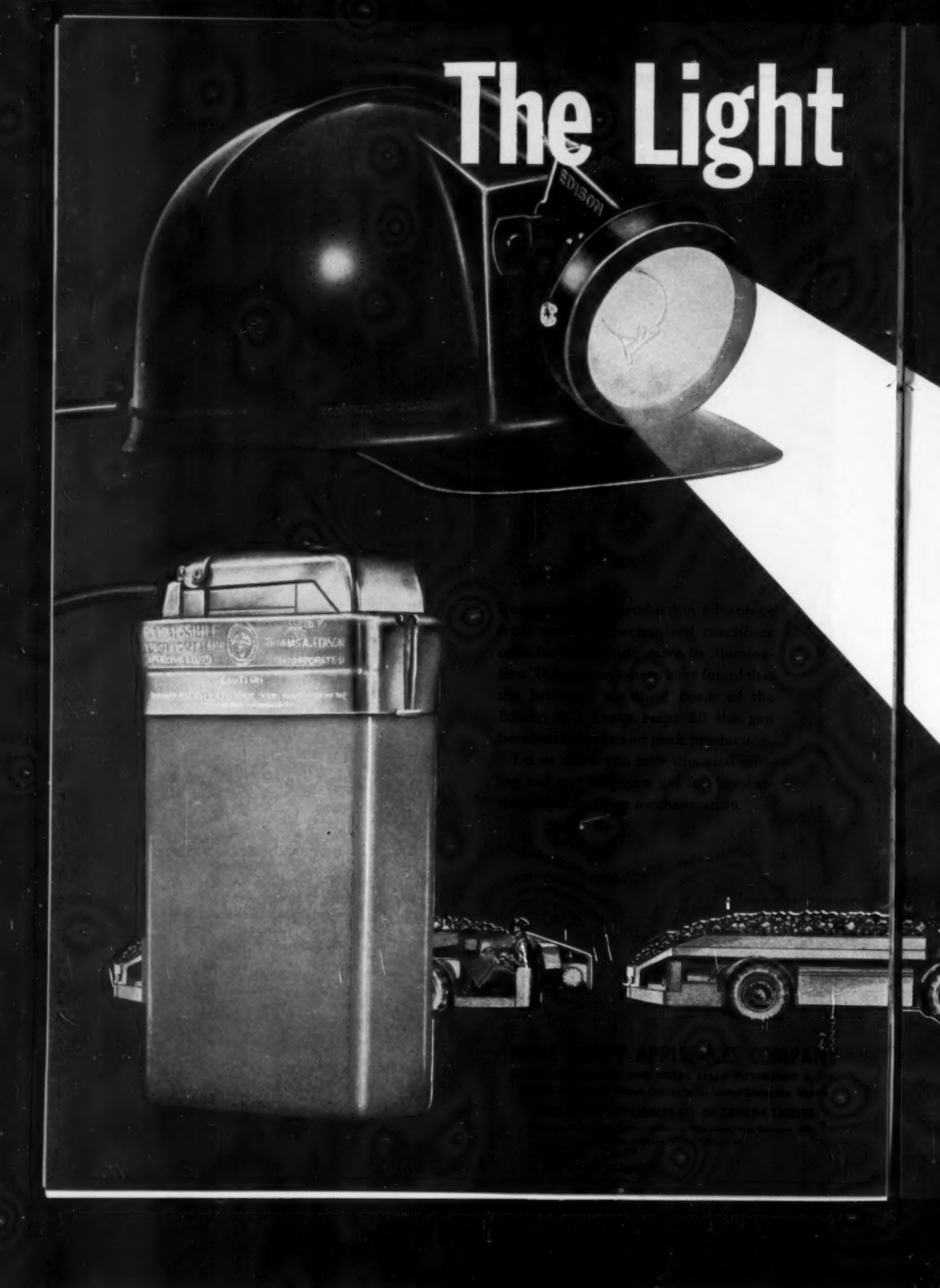

The Light
EDISON

that helps fill that *Extra* car

MSA

SAFETY EQUIPMENT HEADQUARTERS

SERVING SAFETY 40 YEARS 1914 • 1954

Now . . . immediate delivery

CC-1
Medium-Duty Bit

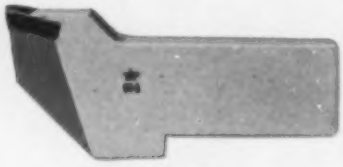
SPECIFICATIONS			
Order No.	Width	Height	Length
CC-1	½"	1"	4"

CC-2
Heavy-Duty Bit

SPECIFICATIONS			
Order No.	Width	Height	Length
CC-2	½"	1"	4"

CCS-2
Heavy-Duty Bit with Stop

SPECIFICATIONS				
Order No.	Width	Height	Length	Stop
CCS-2	½"	1"	4"	1¼"



CC-3
Extra Heavy-Duty Bit

SPECIFICATIONS				
Order No.	Width	Height	Length	Step
CC-3	½"	1"	3⅛"	1⅛"

CC-4
Ripper Head Bit

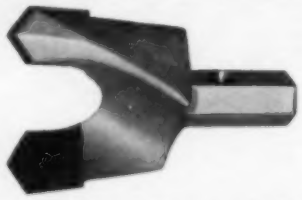
SPECIFICATIONS			
Order No.	Width	Height	Length
CC-4	¾"	1½"	5⅛"

Finger Bit

SPECIFICATIONS			
Order No.	Width	Height	Length
FB-8-3	½"	½"	2¾"
FB-8-5	½"	½"	3"

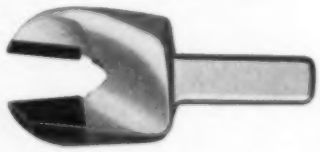
Square-Shank Auger Drill

SPECIFICATIONS			
Order No.	Diameter	Length	Shank
AD-1½	1½"	3"	½"
AD-1⅝	1⅝"	3"	½"
AD-1¾	1¾"	3½"	½"
AD-1⅞	1⅞"	3⅞"	½"
AD-2	2"	3¹¹⁄₁₆"	⅝"
AD-2¼S	2¼"	3⅞"	⅝"



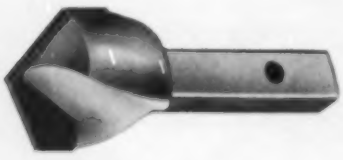
Hex-Shank Auger Drill

SPECIFICATIONS			
Order No.	Diameter	Length	Shank
AD-2¼H	2¼"	4⅛"	¹³⁄₁₆"
AD-2½	2½"	4⅝"	¹³⁄₁₆"
AD-2¾	2¾"	4¹¹⁄₁₆"	¹³⁄₁₆"
AD-3	3"	5⅛"	1⅛"



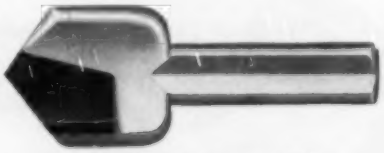
V-Prong Auger Drill

SPECIFICATIONS			
Order No.	Diameter	Length	Shank
ADN-1¾	1¾"	3⅞"	½" sq.
ADN-1⅞	1⅞"	3⅞"	½" sq.
ADN-2	2"	3½"	⅝" sq.



Roof-Bolting Drill
Solid Type

SPECIFICATIONS			
Order No.	Diameter	Length	Shank
PT-1¾	1¾"	2¹³⁄₃₂"	½"
PT-1½	1½"	2¹³⁄₃₂"	½"



Roof-Bolting Drill
Solid Type with Waterway

SPECIFICATIONS			
Order No.	Diameter	Length	Shank
PTH-1¾	1⅝"	2¹³⁄₃₂"	½"
PTH-1⅝	1⅝"	2¹³⁄₃₂"	½"
PTH-1½	1½"	2¹³⁄₃₂"	½"

Roof-Bolting Drill
Prong Type

SPECIFICATIONS			
Order No.	Diameter	Length	Shank
APT-1⅝	1⅝"	2¹³⁄₁₆"	½" sq.
APT-1½	1½"	2¹³⁄₁₆"	½" sq.
APT-1⅜	1⅜"	3 1⁄₁₆"	½" sq.

on new, full line of Carboloy® mining tools

A single, local source—your Authorized Carboloy Mining Tool Distributor—is ready to handle all your requirements from "off the shelf" stocks

WHATEVER your mining tool needs, Carboloy Department now has the right tool—and it's immediately available from your Authorized Carboloy Mining Tool Distributor.

THIS MEANS: Major cost savings, downtime reductions, decreased inventory costs . . .

PLUS: Mine-designed, mine-tested, and mine-proved Carboloy carbide tools. These tools, made by the oldest American carbide manufacturer, will drastically cut tool costs per ton.

REASON: The Carboloy organization, during the past 26 years, has built into its tools painstaking research, skillful engineering and rigid production standards. These built-in "extras" result in less tool breakage, longer tool life under any operating conditions.

Check your requirements against the tools on the opposite page – and order from your nearby Authorized Carboloy Mining Tool Distributor, listed below.

AUTHORIZED CARBOLOY MINING TOOL DISTRIBUTORS

Fast local delivery saves you time and money!

ALA.	**Birmingham 2** Shook & Fletcher Supply Co.	**OHIO**	**Cambridge** Cambridge Machine & Supply Co.	**TEXAS**	**El Paso** El Paso Saw & Belting Co.
COLO.	**Denver 17** Mine & Smelter Supply Co.	**ORE.**	**Portland** J. E. Haseltine & Co.	**UTAH**	**Salt Lake City 11** Mine & Smelter Supply Co.
ILL.	**Christopher** E & E Mine Service Co.	**PA.**	**Johnstown** General Electric Supply Co. Quaker Sales Co.	**VA.**	**McClure** Erwin Supply & Hardware Co., Inc.
IND.	**Evansville** Drillmaster Supply & Mfg. Co.		**Washington** Fairmont Supply Co.	**W. VA.**	**Bluefield** Bluefield Supply Co. Rish Equipment Co.
	Terre Haute The Mine Supply Co., Inc.	**TENN.**	**Knoxville** W. J. Savage Co.		**Fairmont** Fairmont Supply Co.
KY.	**Harlan** General Electric Supply Co. Kentucky Mine Supply Co., Inc.				**Montgomery** Marathon Coal Bit Co.

CARBOLOY

DEPARTMENT OF GENERAL ELECTRIC COMPANY

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New Carboloy Mining Tool Catalog contains complete information, specifications and prices on new, complete line of Carboloy tools. New Maintenance Manual shows you latest maintenance techniques on all carbide mining tools. Send coupon, today, for your free copies.

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☐ New Maintenance Instruction Manual, CM-121

Name _____ Position _____

Company _____

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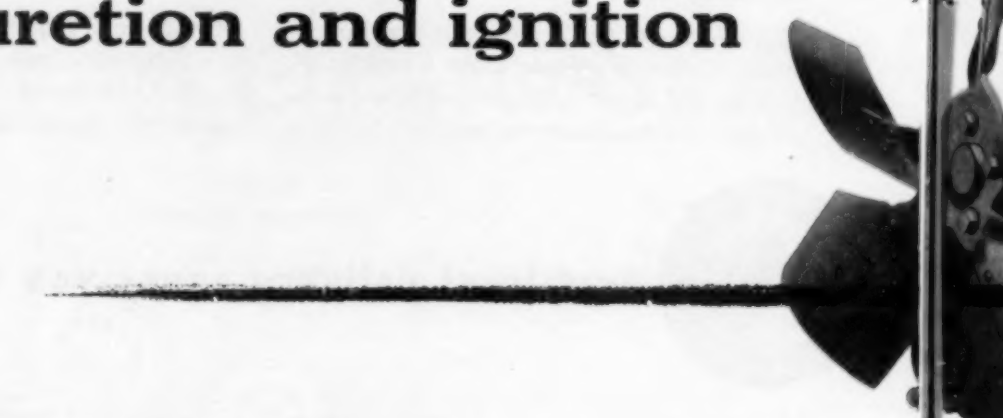
Announcing...

revolutionary new diesel fuel system... as simple as gasoline carburetion and ignition



Exclusive PT Fuel System now standard on all Cummins Diesels

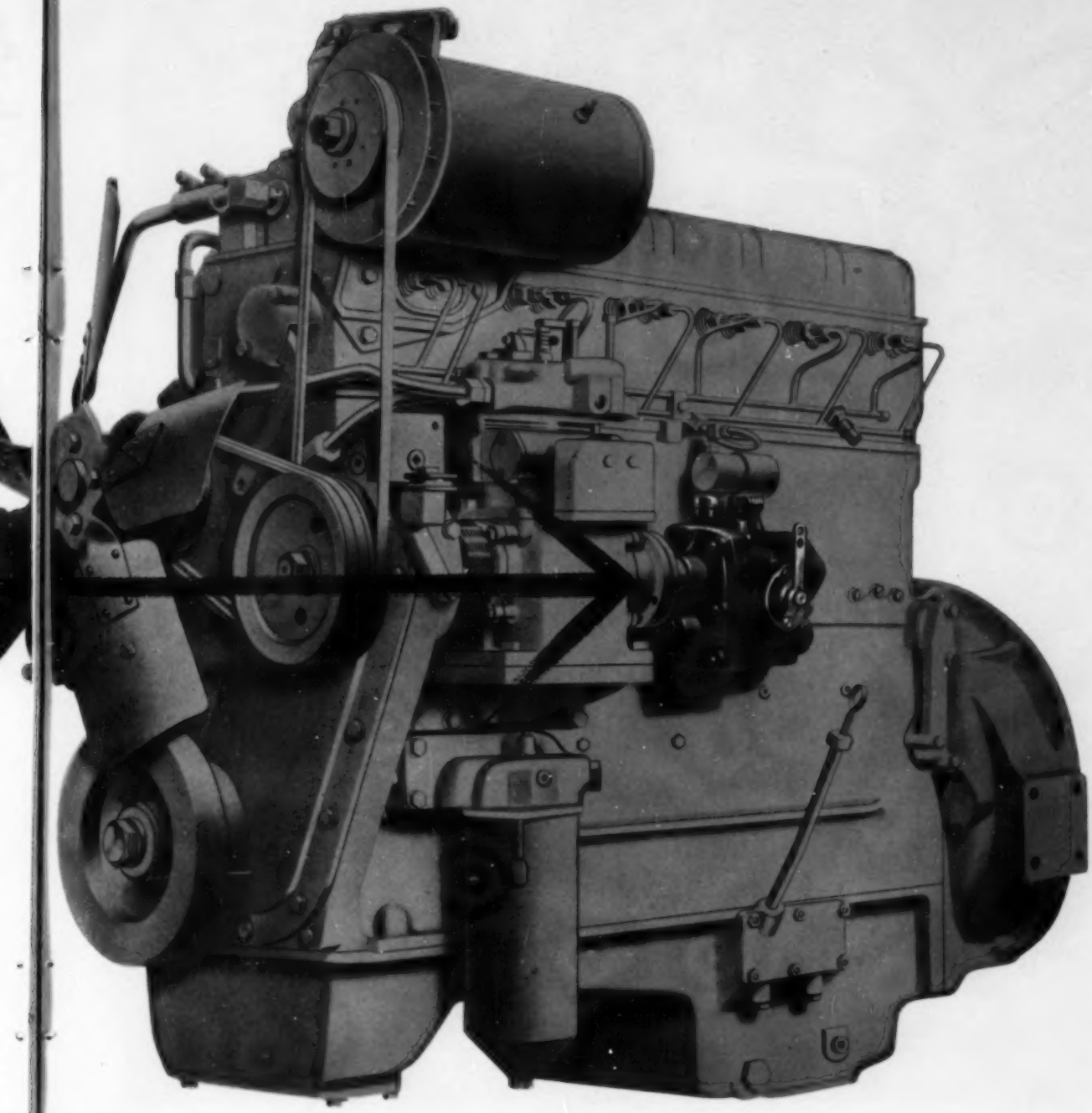
- Drastically reduces maintenance costs
- All mechanics can understand and service it
- Pump weighs only 13 pounds—system has no racks, check valves, metering plungers, discs, floats, etc.— does not have to be timed to engine
- Adaptable to all Cummins Diesels built since 1932

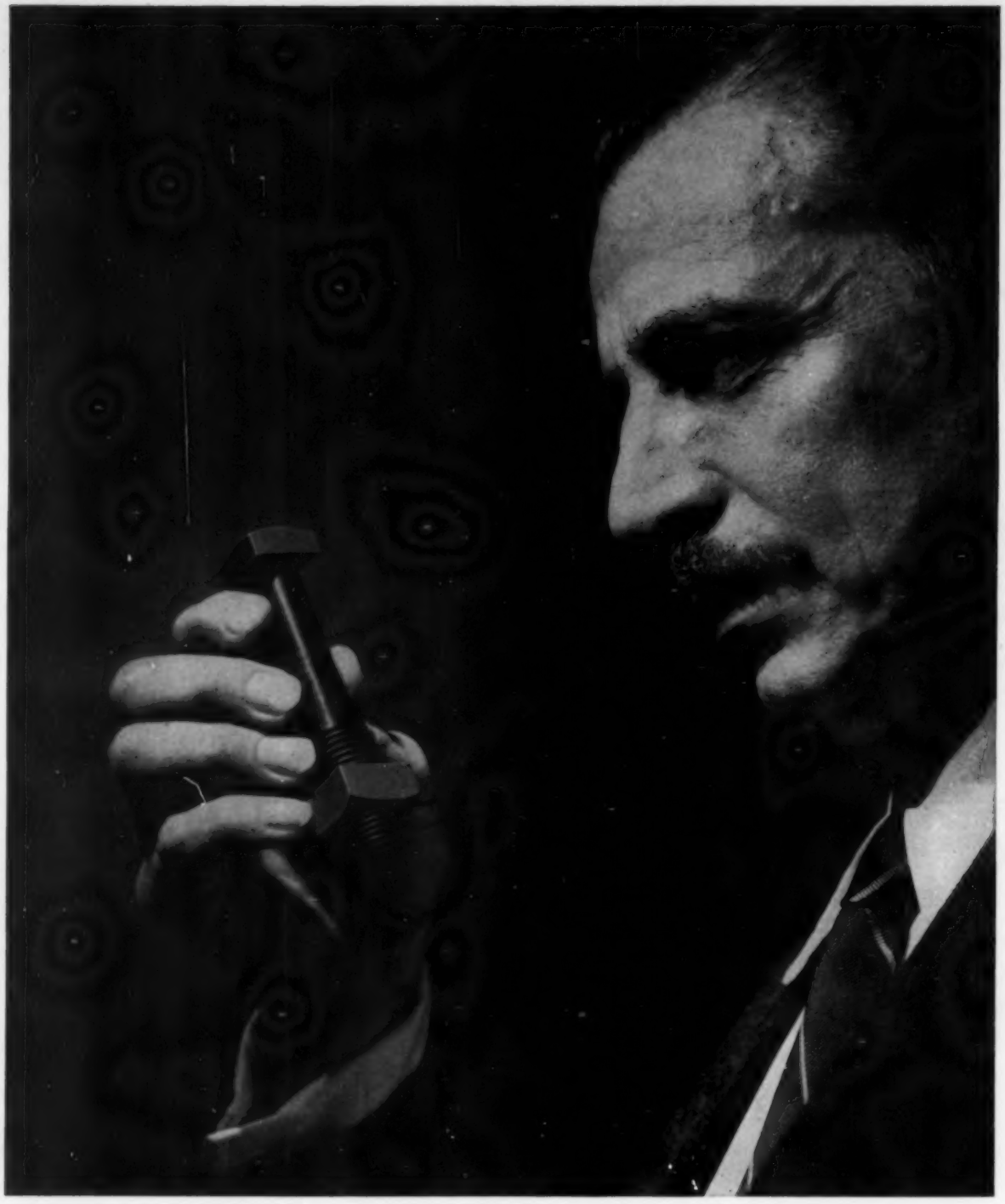
Write for your copy of descriptive folder "Cummins PT Fuel System."

CUMMINS **Cummins**

Engine Company, Inc., Columbus, Indiana

Leader in rugged, lightweight, high-speed diesels (60-600 h.p.)





"We've always admired Bethlehem Machine Bolts for their neat appearance and consistently high quality."

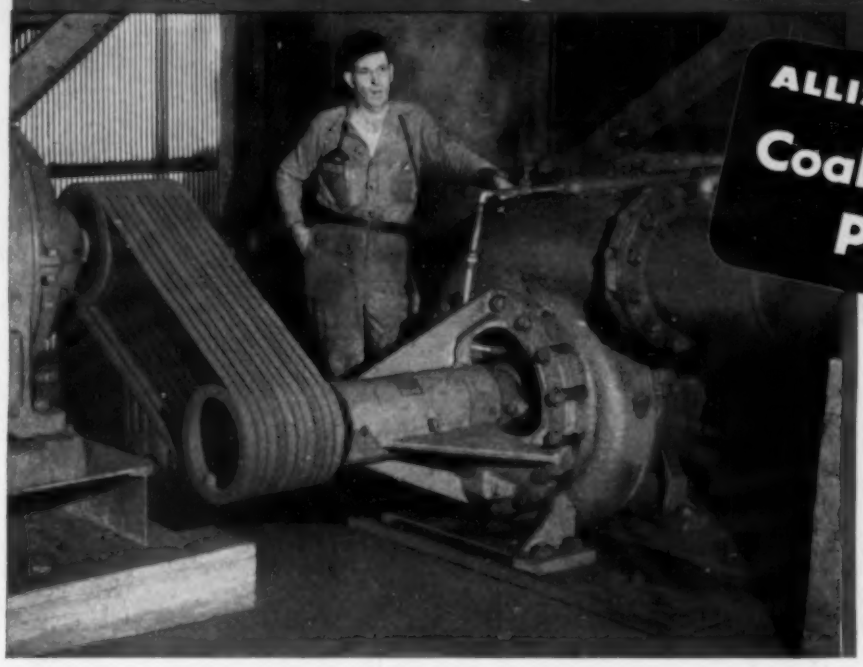
Spikes and track bolts, too!

BETHLEHEM STEEL

Operators Report . . .

"INCREASED PUMPING LIFE 3 TIMES"

"SAVES US $300 PER MONTH IN MAINTENANCE"



ALLIS-CHALMERS
Coal Washing
PUMP

Long Life...Low Cost Operation

Proved by Service Records

In many operations, where other pumps had a life of two or three weeks before they required service, Allis-Chalmers coal washing pumps piled up an impressive record. Typical service records show: 8 months, no loss of capacity — 9 months, 2 and 3 shifts, new impeller — 10 months' service, no parts replaced. These are just a few examples.

Allis-Chalmers coal washing pumps have established this fine record because they are made of a special hard alloy . . . because extra wear is built into impeller and wear plate by the use of *Ni-Hard** . . . because they are built with extra strong parts and extra thickness of metal in critical parts . . . because they are application engineered by men who know coal washing equipment problems.

When replacement finally does become necessary, A-C coal washing pump is easy to tear down and reassemble. Wearing parts are separated into easy-to-handle units. Piping need not be disturbed.

A-4322

* 3 largest sizes special hard alloy throughout.
6 sizes all *Ni-Hard* available.

ONLY 5 WEARING PARTS

Shaft sleeve
Impeller
Casing
Two wear plates

ALL EASY TO HANDLE AND EASY TO REPLACE.

For complete information about Allis-Chalmers coal washing pumps, call your local A-C representative, or write Allis-Chalmers, Milwaukee 1, Wisconsin. Ask for bulletin 08B6381.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

At U. S. Steel Corporation's New Fairless Works: **This conveyor belt is reinforced with Du Pont "Cordura" for greater strength . . . better troughing**

THIS CONVEYOR handles Blast Furnace coke size 4 inches and under from Crushing and Screening Station at Coke Plant to storage bins at Blast Furnace, covering a distance of about one mile.

A conveyor belt system that marks a new high in efficiency and flexibility feeds coke in a steady stream from the coke ovens to the blast furnaces of the Fairless Works of U. S. Steel Corporation at Fairless Hills, Pennsylvania. Shown above is the shuttle conveyor which receives coke coming from the coke ovens . . . moving back and forth under the big belt to distribute coke among several bins. This belt was manufactured by Goodyear Tire & Rubber Company.

The high strength of Du Pont Cordura* High Tenacity Rayon makes possible belting that's stronger, yet thinner, for better troughing and training. And the low stretch of "Cordura" reduces shutdowns for take-up and resplicing.

Before you order your next conveyor belt, inquire about the use of "Cordura" rayon in belts. We'll send you the names of suppliers . . . together with full information. Just write for your free copy of the new booklet, "Mine & Quarry Facts About 'Cordura'." Address: Textile Fibers Dept., Room 11504C, E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.

*REG. U.S. PAT. OFF.

Du Pont "*Cordura*" High Tenacity Rayon

STRENGTH AT LOW COST

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Now available!
Superior insulation featured in new Cyanamid blasting caps

AMERICAN CYANAMID COMPANY
EXPLOSIVES

Cyanamid has for many years been conducting a study of all materials available for blasting cap wire insulation to find one that would offer uniform concentricity—no thin spots. Every type of insulation currently in use has been tested, as have many new materials. Now Cyanamid has an insulation that gives *uniform concentricity*, assures maximum performance!

This new, organosol plastic insulation is applied to wire by a continuous bath method. The wire is dipped in *seven separate baths* and is passed through dies to scrape off excess coating between baths. Each coat is heated to insure perfect set, perfect concentricity. Organosol plastic insulation, because of its uniformity, gives you:

1. **Greater electrical insulation values**
2. **Greater flexibility**
3. **Greater abrasion resistance**
4. **Non-porosity**
5. **Greater moisture resistance**

Capable Field Engineers Are Available At Your Call

HIGH EXPLOSIVES • PERMISSIBLES • BLASTING POWDER
BLASTING ACCESSORIES

Color-Coded for Easy, Sure Identification

Instantaneous, copper wire | Instantaneous, iron wire | Standard Delay | Split Second Delay

AMERICAN Cyanamid COMPANY
EXPLOSIVES DEPARTMENT
30 Rockefeller Plaza, New York 20, N. Y.
Sales Offices: Pittsburgh, Pa.; Bluefield, W. Va.; Scranton, Pa.; Chicago, Ill.; Pottsville, Pa.; Maynard, Mass.

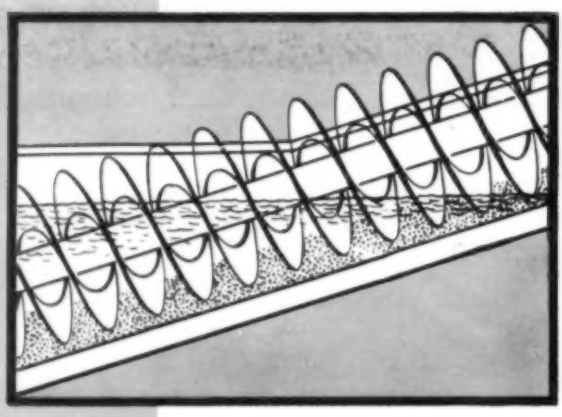
how

AKINS

leadership in mechanical performance can help you cut costs

Classifiers and heavy media separators are selected on the basis of low-cost-per-ton output resulting from efficient, dependable mechanical and metallurgical performance. That's why so many successful mining companies throughout the world continue to order *and reorder* Akins.

for example...



the main shaft

- the rugged Akins main shaft, with greater wall thickness than ordinary classifiers, is designed to permit using a smaller diameter shaft... to obtain maximum metallurgical efficiency. It results in larger active pool and provides for adequate space between the shaft and the flights to obtain the proper drainage of fines necessary for a quiet pool and efficient classification — thus, low-cost-per-ton production.

WRITE FOR CATALOG

COLORADO IRON WORKS CO.

1624 17th Street • Denver 2, Colorado

AKINS CLASSIFIERS • SKINNER ROASTERS • LOWDEN DRYERS

A SUBSIDIARY OF THE MINE & SMELTER SUPPLY CO.

Licensed Manufacturers and Sales Representatives:
Canadian Locomotive Co., Ltd., Kingston, Ont., Canada
John Carruthers & Co. (Pty.), Ltd., Sydney, Australia
Head, Wrightson & Co., Ltd., Stockton-on-Tees, England
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Continental Sales and Equipment Co., Hibbing, Minnesota
Edw. J. Nell Co., Manila, P. I.
Wright Bros., Credit Foncier Bldg., Vancouver, B. C., Canada

Gouges 42" hole through 190' of coal

with TIMKEN® bearings taking the load

THIS McCarthy coal recovery drill bites its way through 190 feet of tough coal. The power needed to cut through the coal is supplied to the auger by a rugged gear drive.

The loads on these gears are heavy and complex—so Salem Tool Company, manufacturers of the McCarthy coal recovery drill, mounts all gear shafts on Timken® tapered roller bearings.

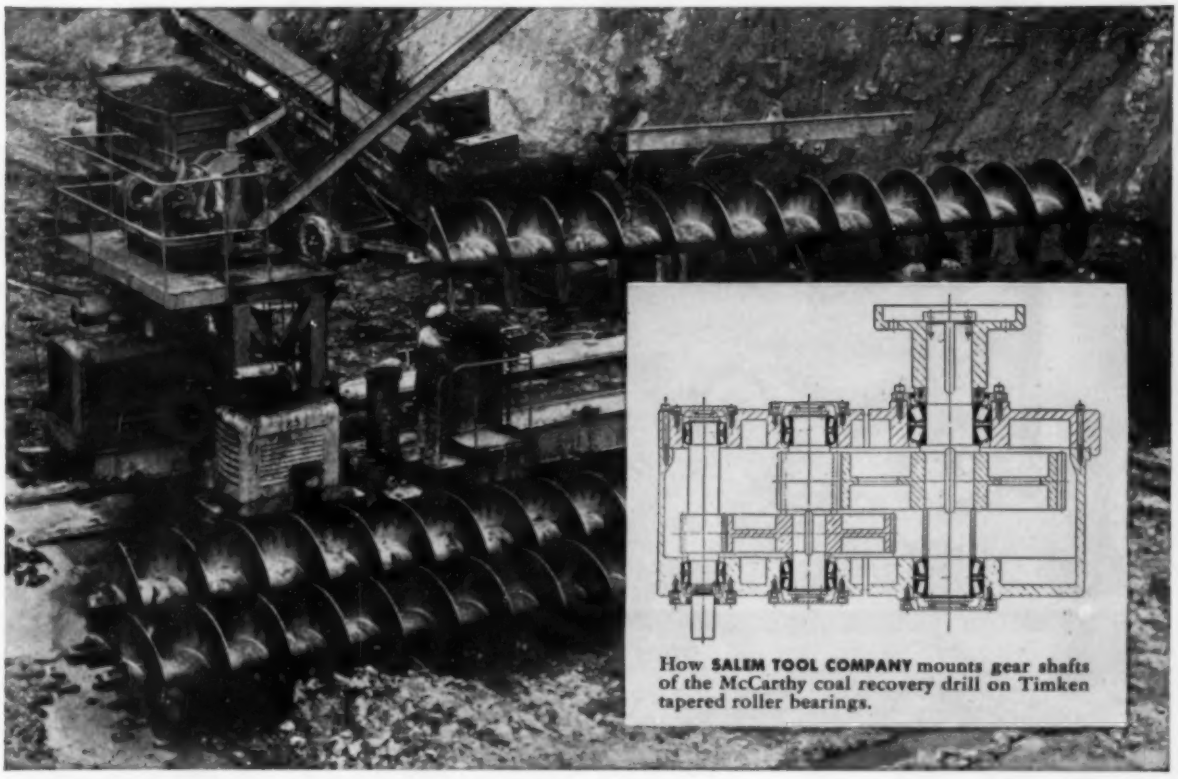
Timken bearings can take the heavy loads because line contact between their rollers and races provides extra load-carrying capacity.

The bevel gears in the drive exert both a radial and a *thrust* load. But, the tapered design of Timken bearings enables them to take both radial and thrust loads in any combination. No extra thrust devices are required. Despite the heavy, grinding loads on these gears, Timken bearings keep them in accurate alignment. This helps insure long life and trouble-free performance.

Dirt and dust can be a big problem in applications like this. But Timken bearings are built to close tolerances; they keep the gear shafts concentric with their housings making bearing closures more effective. Lubricant stays in; dirt, dust and moisture stay out.

When you buy or build equipment, always look for the trade-mark "Timken" on the bearings. It's a sure sign of quality. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **SALEM TOOL COMPANY** mounts gear shafts of the McCarthy coal recovery drill on Timken tapered roller bearings.

WE MAKE OUR OWN STEEL

The special grade alloy steel which gives Timken bearings their strength and resistance to wear is made in our own steel mills.

The Timken Roller Bearing Company is the acknowledged leader in: 1. advanced design; 2. precision manufacturing; 3. rigid quality control; 4. special analysis steels.

TIMKEN

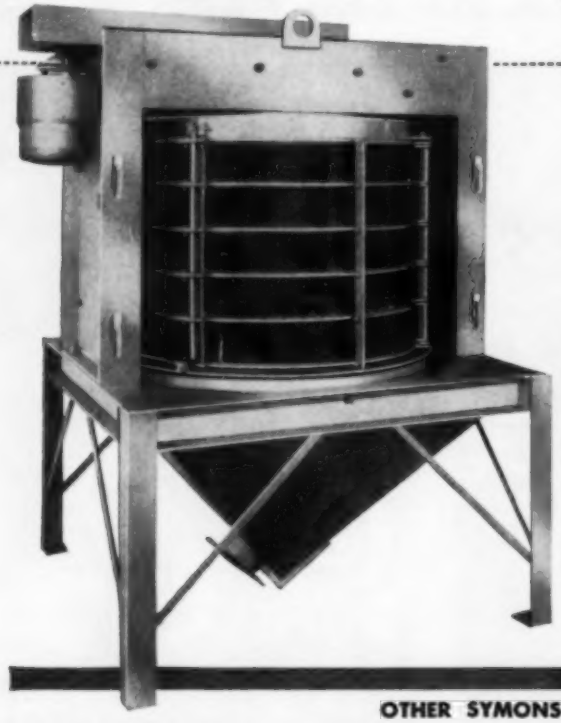
TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ↓ AND THRUST →○← LOADS OR ANY COMBINATION →○←

These SYMONS "V" SCREEN advantages result in BETTER COAL PREPARATION AT LOWER COST...

- **HIGH CAPACITY** . . . made possible by new screening principle employing controlled diffused feed and vertical flow of material.
- **MEETS WIDE RANGE OF SCREENING NEEDS** . . . makes sharp separation of wet or dry materials in much finer meshes than conventional screens.
- **EFFICIENT DEWATERING** . . . low rotary speed and high speed gyratory action produces a much dryer product.
- **EFFICIENT DRY SCREENING** . . . a natural "fanning" action carries the "air float" through with the undersize, making the handling of lightweight materials extremely effective.



● The Symons® "V" Screen effectively combines centrifugal and gravitational forces. This proven screen offers increased efficiency and economy in many phases of modern coal preparation service . . . including Sizing—Dedusting and Dewatering.

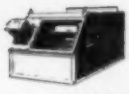
Requiring a minimum of floor space, the Symons "V" Screen is easily installed, and provides fully enclosed construction to assure dustless operation—yet access to the screen is simplified through easily removable covers. Mail the coupon for further details.

OTHER SYMONS SCREENS

SYMONS HORIZONTAL SCREENS

SYMONS ROD DECK SCREENS

SYMONS BAR GRIZZLIES



SYMONS ROD GRIZZLIES

SYMONS . . . A REGISTERED NORDBERG TRADEMARK KNOWN THROUGHOUT THE WORLD

NORDBERG MFG. CO., Milwaukee, Wisconsin

MAIL THIS COUPON TODAY CA

NORDBERG MFG. CO., Milwaukee, Wisconsin

Please send me further information on the following screens for coal preparation service:

☐ Symons "V" Screens ☐ Symons Rod Deck Screens
☐ Symons Horizontal Screens ☐ Symons Grizzlies

Name..... Title.....

Company .....

Address .....

City..... Zone.... State.....

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MACHINERY FOR PROCESSING ORES and INDUSTRIAL MINERALS

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ANOTHER

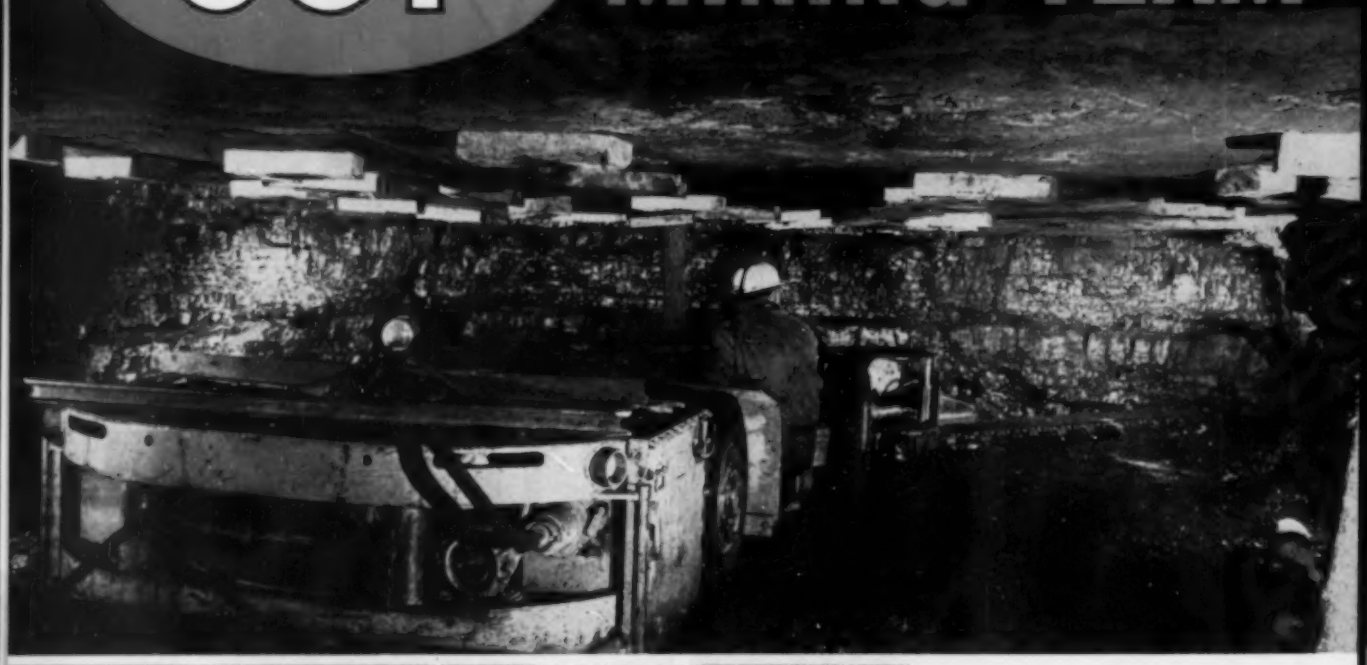
JOY

SUCCESS STORY

870 TONS REACHED IN ONE SHIFT WITH THIS TEAM

Turn the page for details

JOY MINING TEAM



Above, left: The Joy 11-RU is a fast-tramming, fast-cutting, rubber-tired universal cutter that will shear-cut, bottom-cut, center-cut or top-cut anywhere in the seam. Only 31″ high for trackless operation in medium-low coal, and equipped with field-proved Bugduster.

Above, right: The Joy Super 14-BU is in a class by itself among self-propelled mechanical loaders for medium-height seams. Built in 31½″, 33″ and 36″ heights, with maximum loading capacity of 10 tons per minute, this dependable unit is powered and constructed on the "extra" principle throughout, for maximum speed and ruggedness in heavy duty service.

Center, left: The CD-22 Coal Drill is a single-boom hydraulic drill, 30″ high. Rubber tire-mounted and readily maneuverable, this mobile Joy drill permits fast and accurate hole positioning. Infinitely variable hydraulic control of feed and speed assures fast drilling under all conditions.

Bottom, left: The Joy 6-SC Shuttle Car can make its round trip from the face in less time than any other car in its class. Has exclusive features of drive, steering, braking and control that mean greater speed, power, maneuverability, safety and dependability. Built in heights from 29″ to 38½″ for capacities from 100 to 180 cu. ft.

HITS 870-TON SHIFT

JOY 11-RU WITH BUGDUSTER, CD-22, SUPER 14-BU AND 6-SC COMBINATION AVERAGES OVER 500 TONS PER SHIFT

Equipment Team: one Joy 11-RU Universal Cutter with Bugduster, one Joy CD-22 Coal Drill, one Joy Super 14-BU Loader and three Joy 6-SC Shuttle Cars.

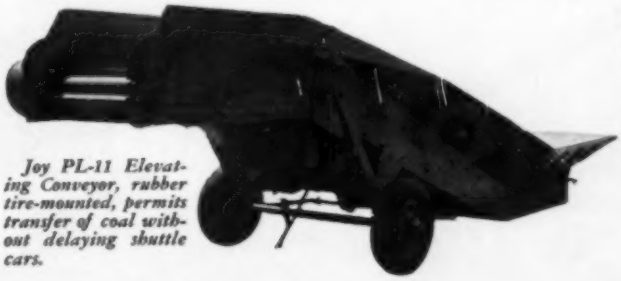
Number of Men: 13-man production crew.

Operating Conditions: This equipment is being used in a West Virginia mine, working in a seam varying from 4½ to 6 feet high. The seam contains a band of hard slate 4″ to 8″ thick. Grades encountered vary from 3 to 4 per cent. The top is slate and laminated sandstone, bolted with expansion bolts; and the bottom is firm fireclay. The average shuttle car haul one-way is 275 feet, with a maximum one-way trip of 500 feet. A Joy PL-11 Elevating Conveyor receives coal from the shuttle cars at the mine car loading point.

Performance Record: Average production over a month's period has exceeded 500 tons per shift. Maximum production reached a high of 870 tons per shift.

★ ★ ★

No matter what your requirements may be, there is a Joy high-capacity equipment team that can help you show a profit, or increase your margin. For any system, including modern continuous mining with continuous haulage . . . or for any seam condition, Joy has a *field-proved* answer for you. ● *Let us work with you!* **Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*



Joy PL-11 Elevating Conveyor, rubber tire-mounted, permits transfer of coal without delaying shuttle cars.

WRITE FOR BULLETINS, OR

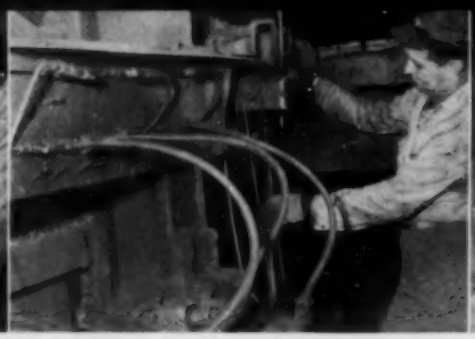
Consult a Joy Engineer

W&D CL5302

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

Here's the heart of the Alemite Centralized Lubrication System at Hazleton. From this one 400-pound refinery drum, fresh lubricant is pumped direct to every bearing in the entire fifteen story plant. The results in time saved are amazing!



Note the automatic control linked directly to the machine. On these shaker bearings, lubricant is applied every five minutes while plant is in operation. Lubricant is protected all the way from barrel to bearing—no grit or dust in bearings!

Where the need for lubrication is not as extreme, as on these crusher bearings, automatic operation is not needed. The oiler simply turns a valve and the proper amount of lubricant is applied. Just one grease man handles the entire plant!

HOW ALEMITE CENTRALIZED LUBRICATION *adds $30 a day to profits!*

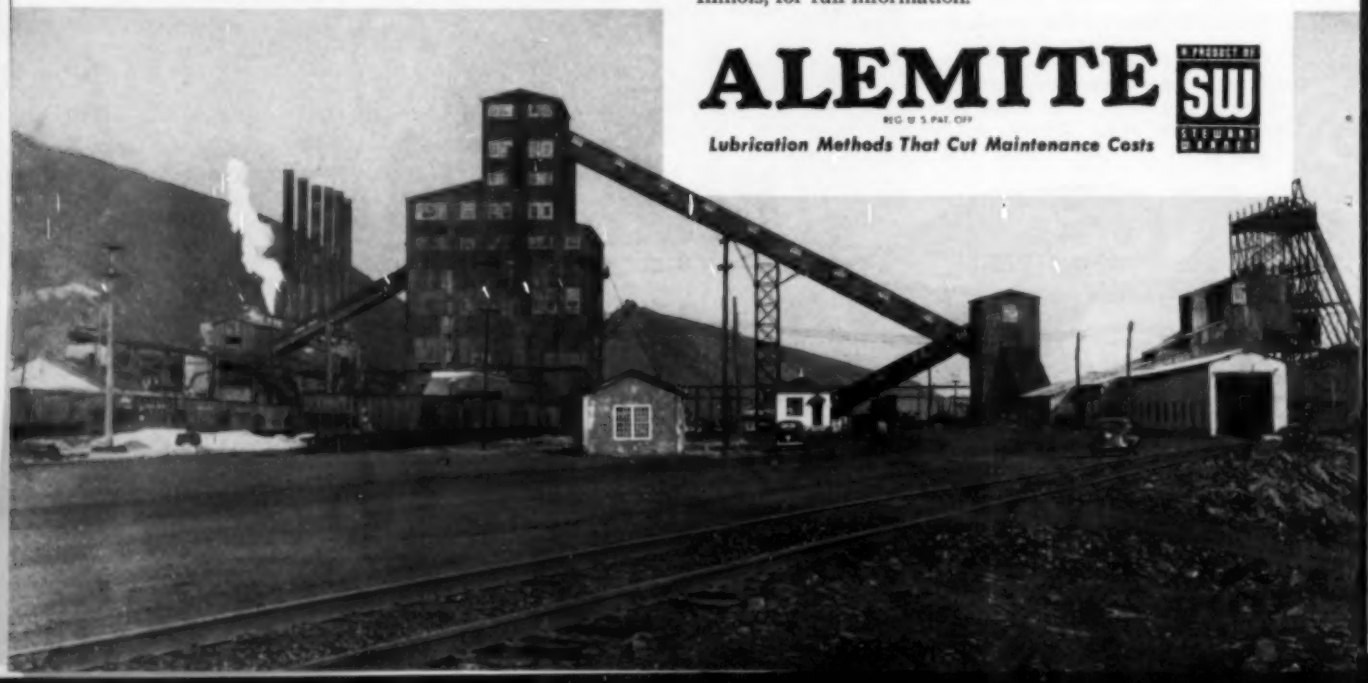
Protects hard working bearings at the Hazleton Shaft Colliery— Saves money... man power... maintenance!

When the LeHigh Valley Coal Company installed Alemite Centralized Lubrication in their Hazleton Shaft Colliery, the immediate saving was *$30 a day* in maintenance costs! Even more important than this direct saving is the extended bearing life despite extremes of hot and cold, grit, water, dust—all the hazards that are common to coal processing.

Every five minutes, bearings on hard-working shakers receive a metered shot of lubricant—automatically! Crusher bearings are lubricated every hour. Every bearing in the fifteen story plant is lubricated—on schedule—from one central point—without shutting down a single machine! Downtime for lubrication is completely eliminated!

Throughout the coal industry Alemite has an impressive record of savings effected in labor, maintenance, downtime—plus increased tonnage. Find out how Alemite can solve your toughest lubrication problems—save you money! Write Alemite, Dept. E-84, 1850 Diversey Parkway, Chicago 14, Illinois, for full information.

ALEMITE
REG U S PAT OFF
A PRODUCT OF SW STEWART-WARNER
Lubrication Methods That Cut Maintenance Costs



J&L's New JALTEN series enables you to select low-alloy, high-strength steel in the following combinations of advantages:

JALTEN No. 1 — High strength, good formability and fabricating —good resistance to low temperature impact.

JALTEN No. 2 — High strength, moderate forming—improved resistance to atmospheric corrosion.

JALTEN No. 3 — High strength—improved resistance to abrasion.

Remember to specify JALTEN High Tensile Steel for

- HIGH STRENGTH
- RESISTANCE TO CORROSION
- GOOD FORMABILITY
- RESISTANCE TO ABRASION

J&L STEEL

Jones & Laughlin
STEEL CORPORATION — *Pittsburgh*

The data you want is in this book:

- Chemical Properties of Jalten
- Mechanical Properties of Jalten
- Jalten Equivalents
- Jalten Application Data

Jones & Laughlin Steel Corporation
Dept. 411, 3 Gateway Center, Pittsburgh 30, Pa.

Please forward a copy of your booklet, Jalten low-alloy, high-strength steel.

Name_____

Company_____

Address_____

The 2 Best Ways

Method a — USE THE OLIVER

This method calls for classification by any conventional method of the −½" to 0 fines coming from washing operations into two parts: coarse (−½" to ±16 mesh) and fines (±16 to 0). The coarse is fed to the filter at the normal feed point as indicated on the sketch. Then, feed the fines. In this way, the coarse acts as precoat or filtering medium.

The dewatered end product is the same as the original, the coarse and fines being re-mixed while being discharged. The dry blending problem is thus eliminated.

Method b — USE THE OLIVER

This method also calls for classification of the − ½" to 0 coal, the classified products being in two size ranges.

Two end-products are produced with this method: −½" to ±16 from the Horizontal and ±16 to 0 from the American, both end-products being drier than in Method A.

The choice between the two methods would depend upon use of end-product and character of feed.

TO DEWATER COAL 'FINES'

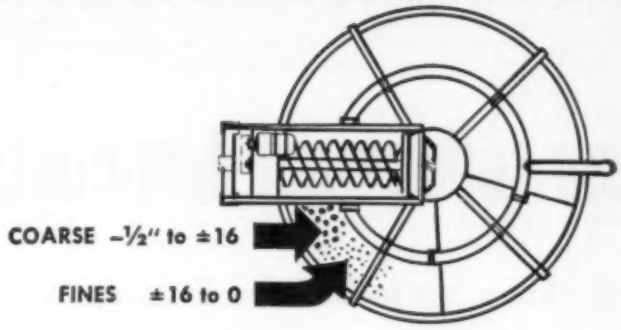
...fines ranging from -½" to 0

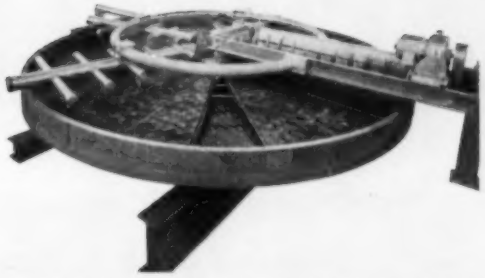
These two suggested methods for dewatering coal fines make use of one or both of these efficient coal dewaterers. Both produce uniform cake with uniform moisture content. Each produces filtrate suitable for re-use in the washery. Results from installations prove these important points.

The other point worth keeping in mind when considering coal dewaterers is that dewatering *is* filtering and filtration equipment has been our business since 1907. We have the experience needed to help you in your selection. We have the testing equipment to make tests right in your own washery.

Our nearest office will be glad to send a competent, experienced, coal dewatering engineer to discuss your fines control problem.

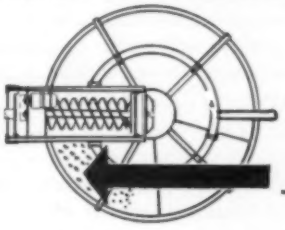
HORIZONTAL FILTER *to do the Complete Job*

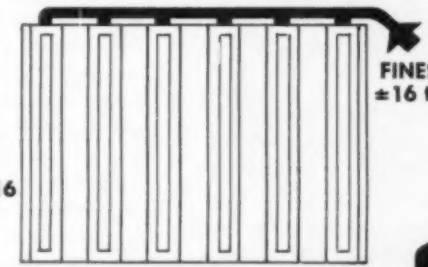


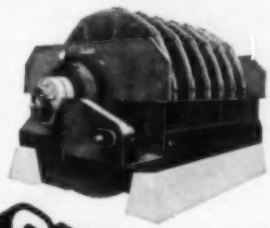


HORIZONTAL FILTER *for coarse (-½" to ±16 mesh)*

and the AMERICAN DISC TYPE FILTER for fines (±16 mesh to 0).







WORLD WIDE SALES, SERVICE AND MANUFACTURING FACILITIES

OLIVER UNITED FILTERS INC.

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ENGINEERING REPORTS:

NERVE CENTER of coal plant operation is this G-E master control board. Operator can start, stop all units from this board, and has visual indication that all units are running, as well as levels of various bins and tanks. Starter buttons are arranged in order of starting sequence to permit ease of operation of the master control board.

G.E. helps Pocahontas reduce per ton costs

General Electric engineering services a key factor in Pocahontas's expansion plans to increase tonnage capacity, cut per ton costs

Pocahontas Fuel Company, Incorporated, has completed the second of two modern preparation plants designed to expand its tonnage capacity and reduce its per ton production costs. The first was at Itmann, W. Va., and the second is at Amonate, Va.—both utilized General Electric engineering services and equipment.

Working closely with Fairmont Machinery Company and West Virginia Electric Corporation, the contractors, G-E engineers helped in the design and installation of the electrical systems in the newly modernized heavy media section and the new fine section of the coal plant at Amonate. The plant is now producing more than 8000 tons a day in two eight-hour shifts.

The modernization and expansion at Amonate was handled on a project basis, from planning stage to completion. G.E. co-ordinated the selection, manufacture, and delivery of all required electrical components, to assure that the right equipment arrived at the right time.

First, a sales engineer focused the engineering resources of the General Electric organization on specific Pocahontas problems. G-E application engineers, assisted by product specialists, selected the right equipment to work together as an electrical system saving valuable time for Pocahontas engineers.

Pocahontas and Fairmont Machinery were kept regularly informed of production progress on electrical equipment. Care was taken to deliver components in the right order and at the right time so installation crews worked at top efficiency.

G-E field service engineers were available at Amonate to help supervise installations and check operation of the plant. They are available now, on short notice, for any further assistance needed.

EASY-TO-INSTALL G-E Cabinetrol* panel gives neat, centralized control at Amonate plant. Units were delivered assembled and wired to cut installation time.

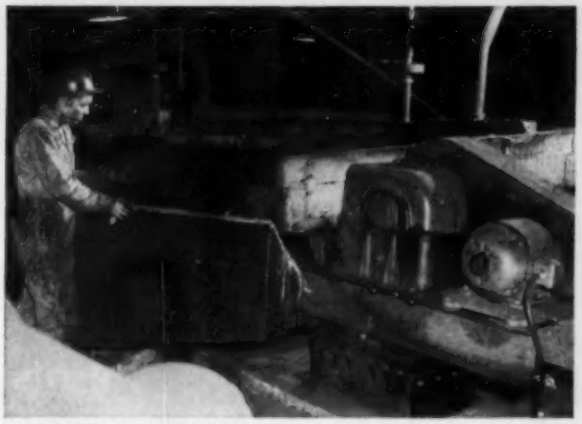
at Amonate plant

The modernization and expansion which the Pocahontas Fuel Company has undertaken is indicative of the industry's trend. The market calls for a higher quality product than ever before. The new Amonate plant, tall as an eight-story building, is operated by four men. Hundreds of tons of coal are cleaned each hour with push-button ease.

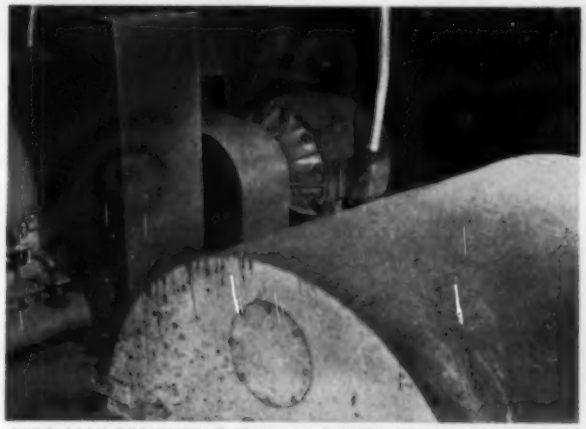
General Electric is ready to assist you in applying up-to-date electric equipment to help reduce your coal-processing costs. Whatever your problems, G-E system-engineered drives keep processing in step, minimize downtime, make most efficient use of manpower. For more information, contact your local G-E Apparatus Sales Office, or write for Bulletin GEA-5308, "Electrified Coal Preparation," to General Electric Co., Section 663-41, Schenectady 5, N. Y.

*Reg. Trademark of General Electric Co.

EASY-TO-MAINTAIN G-E Tri-Clad* 50-hp motor operates main fine coal conveyor. This totally enclosed fan-cooled motor delivers over 4500 tons of coal into section each day.



CONTINUOUS OPERATION of Deister table is assured by G-E 3-hp motor. The fine coal plant's 24 Deister tables are driven by G-E Tri-Clad motors.



SPECIALLY DESIGNED G-E 200-hp Tri-Clad motor accelerates high inertia drive of centrifugal filter. The totally enclosed fan-cooled motor drives filter with V-belts.

Engineered Electrical Systems for Coal Preparation Plants

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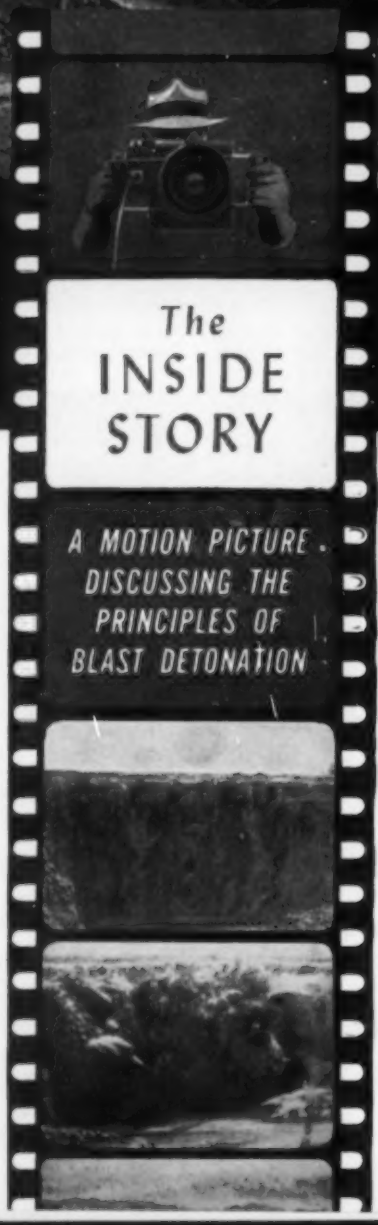

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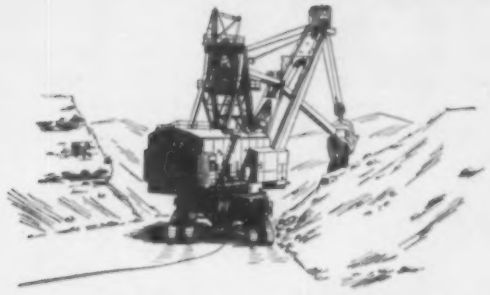

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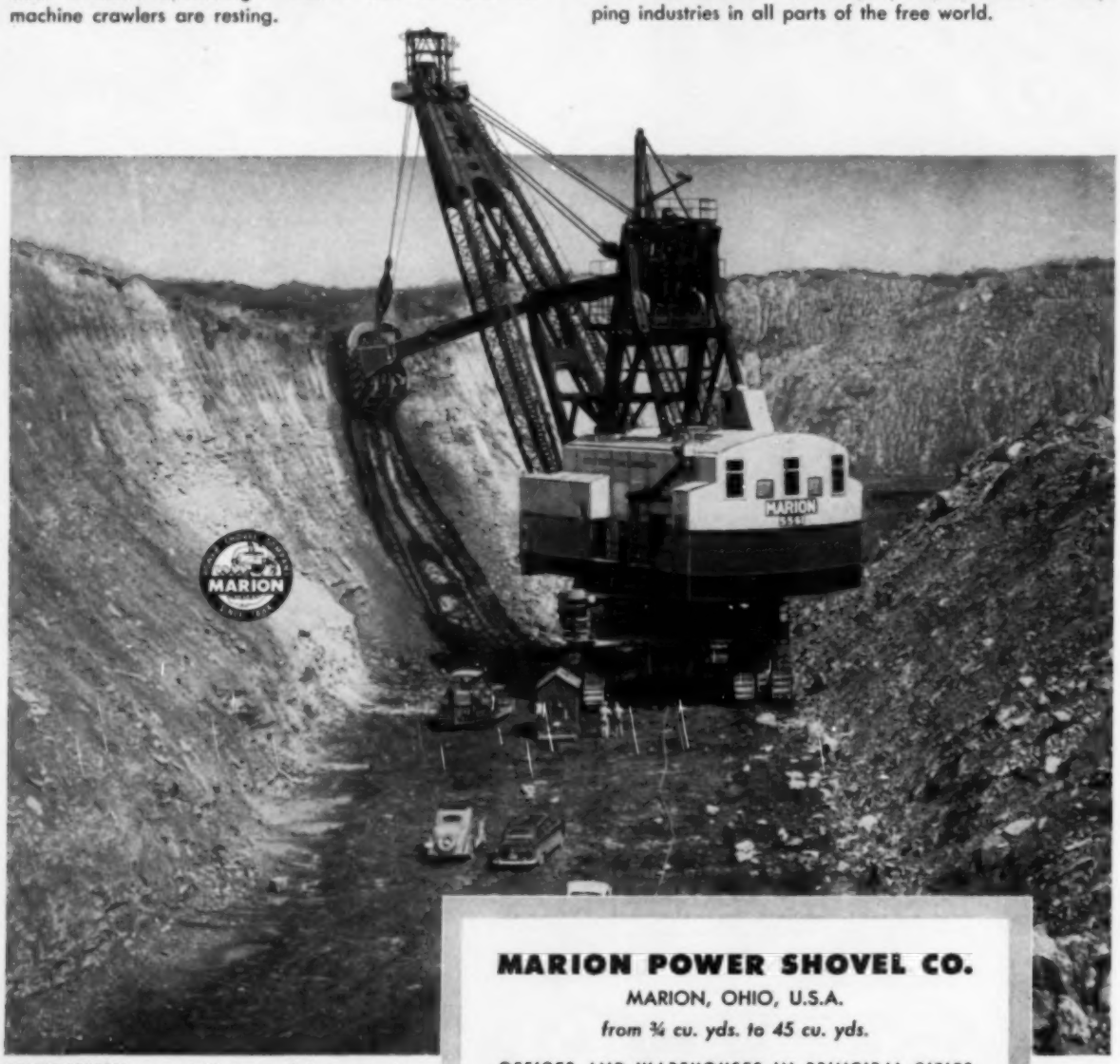

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The incident took place on a pipe line job in Kentucky. Primacord branch lines were hooked up to the trunk, but the detonator had not been attached. The crew left the job when the thunderstorm warning came — and when they returned they discovered that lightning had struck the Primacord in two places, but had failed to detonate it. About six feet of trunk line was gone, and the free ends appeared to have been melted off. The branch line Primacord from four holes, previously tied into the trunk, were also burned off to the collars of the holes. Another burned out section of the trunk line, about two feet long, was found twelve feet away.

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Coal Age

AUGUST, 1954 IVAN A. GIVEN, EDITOR

Total Selling

EVERY DAY, almost, it seems that some one comes up with a new idea for eliminating coal as a source of energy—atoms, solar power and what have you. Maybe it could happen, but the atom, for example, was supposed to sweep away all other forms of energy—and hasn't yet. In fact, the date when the atom will provide the fuel for any appreciable block of power still is a long way off, even if the process should prove competitive.

There is nothing so far in any of the proposals for substitutes for mineral fuels to indicate that they threaten the market in the immediate future —or even that they can become competitive on a major scale as long as large reserves of low-cost mineral fuels exist. So, for the foreseeable future, coal's major competitive headaches remain natural gas, oil and water power. In coking and the generation of electricity, coal has and will keep a definite edge, and will grow with the growth of these industries. And, though coal is not yet on "Easy Street," and perhaps never will be, its prospects seem to be improving in other fields, including domestic and railroad.

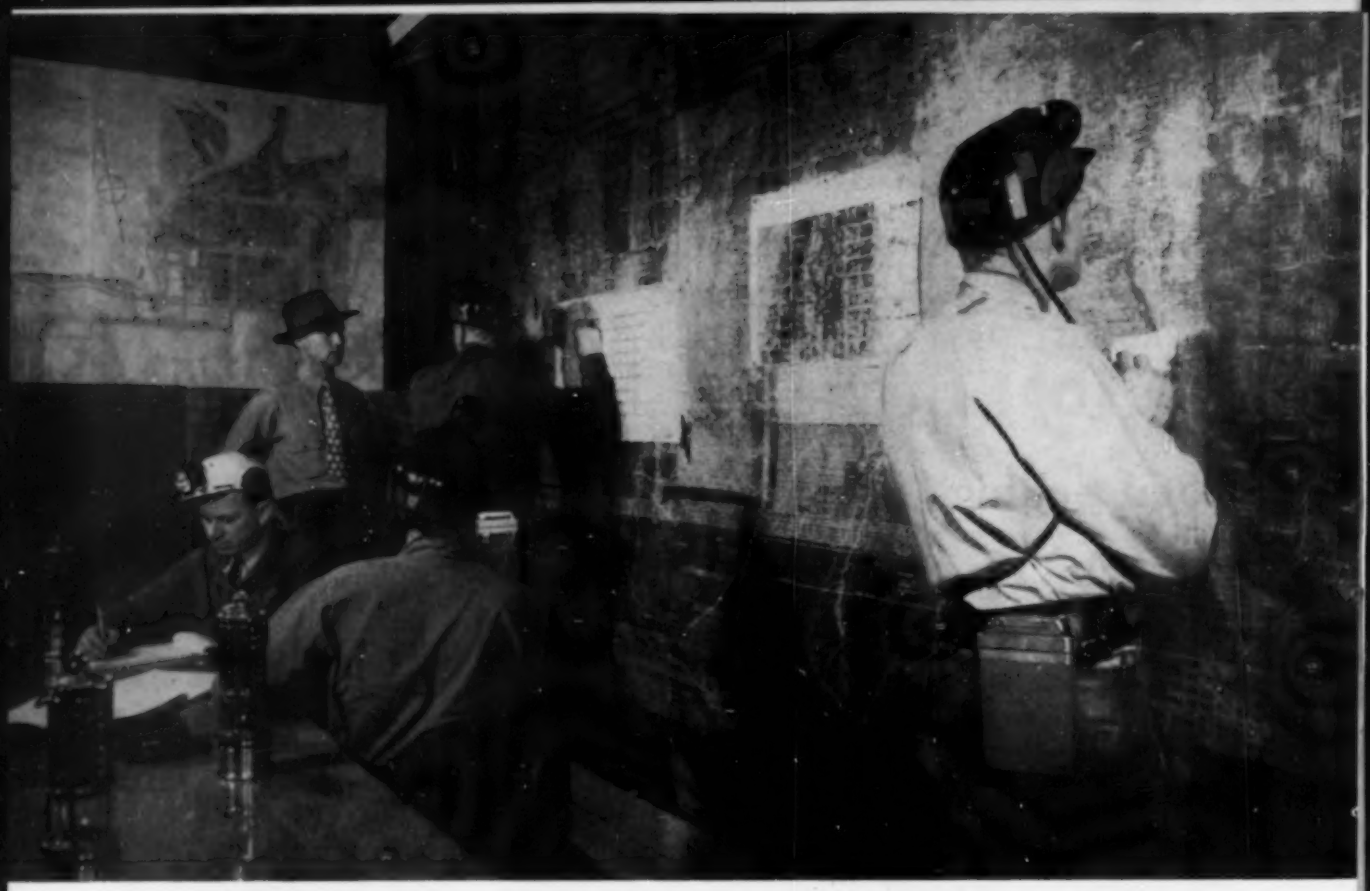
The bituminous domestic market, as an example, is holding its own so far in 1954, and the year may be the second in ten without a significant drop from the preceding year. Perhaps this may be only a temporary interruption in the downward drift, but there is evidence that a real reversal in the trend may be in the making. That evidence is compounded of rising natural-gas and fuel-oil prices, and growing appreciation of what these mean in the cost of operating a home, in turn creating a better climate for coal, which is marking up greater and greater gains in economy, as well as in satisfaction and convenience. There is a parallel situation in the commercial and "other industrial" markets in spite of hard competitive pressure from substitutes, and here, too, available evidence indicates that coal has a growing opportunity.

The road to broader markets is a hard but not impossible one, as the "Minute Men" are now proving in a number of consuming areas. Selling against competition requires getting there first with coal's story, demonstrating how coal burned in modern equipment provides convenience and economy, and providing good service after the coal-burning plant is in. It becomes "Total Selling," the slogan of the NCA Market Promotion Dept., when producers, wholesalers, retailers, railroads, and equipment designers, builders and installers get together to push coal as a fuel. Total selling has proved that it can get results.

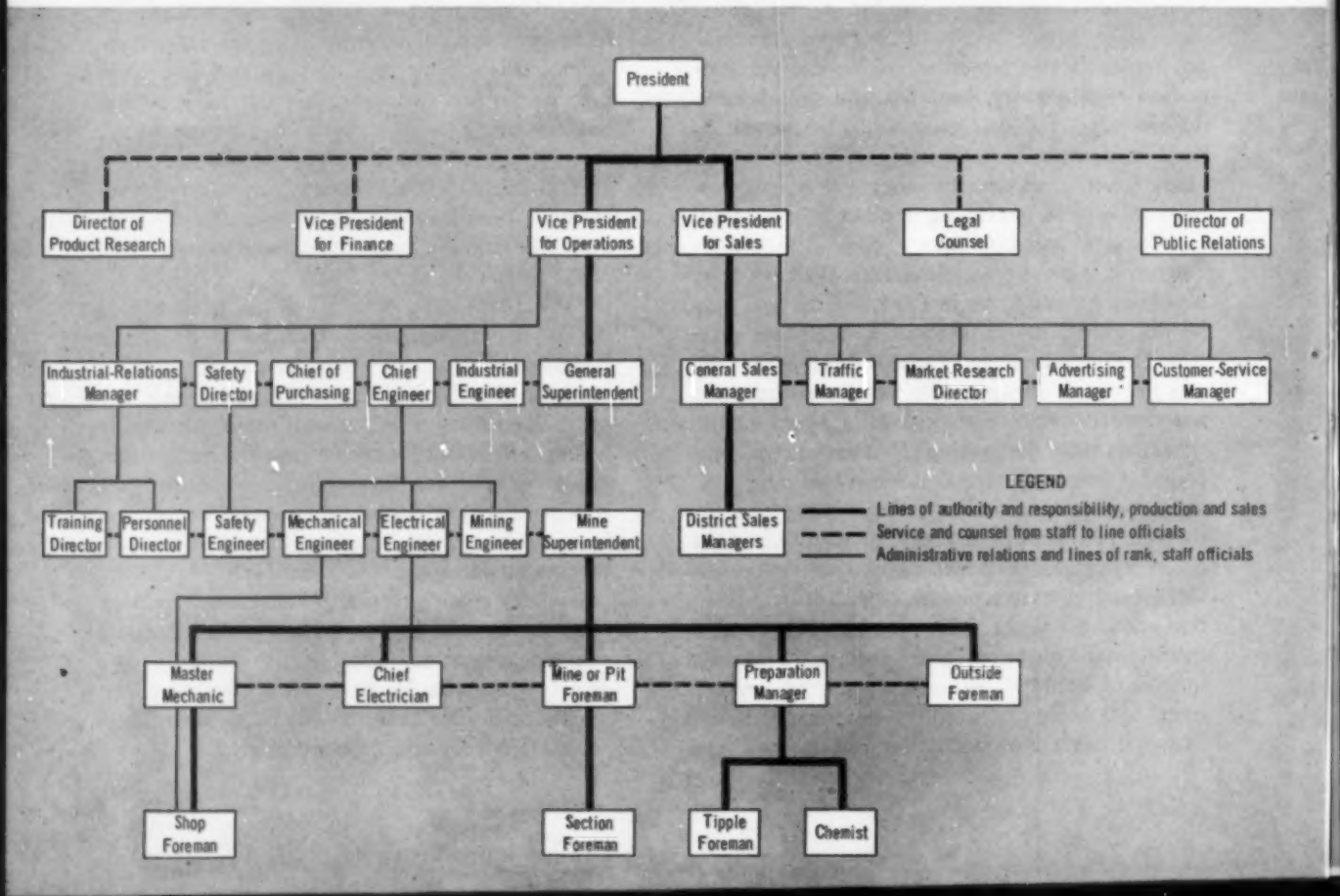
Air and Water

POLLUTION of both air and water is attracting more and more attention from legislators, government officials, civic organizations and just plain people who find swimming less attractive, fishing less rewarding and coping with airborne wastes more of a job. So far the movement is more of a ground swell than a breaking wave carrying all before it, but the swell is growing and coal—from both the mining and utilization angles—is a prime target.

"What should be done?" and "Who should do it?" are major questions. In fact, the situation boils down about as follows: Will coal take positive steps individually and as an industry to help improve conditions or will it wait for regulations to be imposed by outside authorities who may or may not be reasonable in their approach? There already is in existence one outside organization with sweeping powers to check stream pollution, and coal is moving to work with this organization—and with others—to reach practical solutions and prevent hardships in attaining the desired goals. The more coal men can do—individually at their own mining plants, and collectively through co-operative setups—the easier it will be to reach these goals effectively and economically.



MODERN MANAGEMENT musters many varied skills to attack today's problems. In a typical organization chart, solid lines show the chain of command for operations; broken lines, staff officials whose services help line officials.



Better Management Today

Facing up to present conditions, leading coal companies are stressing...

How to find the skills for meeting today's needs

How to focus management talents on pressing problems

How to build strength for coal's brighter tomorrow

By W. A. STANBURY JR., Associate Editor, COAL AGE

MODERNIZING MANAGEMENT to match modern mining machines and methods and make coal strong in the fuels marketplace—that's one of coal's major needs today.

In better times, when coal production and demand are at higher levels, a coal company can survive a few mistakes. But now, when even staying in business is a touch-and-go question for some companies, almost any mistake can bring disaster.

That's why coal companies today put a high premium on special skills and informed good judgment among their management men. And it's why facts, upon which management men must base decisions that crowd in upon them, are priceless.

Accordingly, coal companies that are alert to today's changing needs are redrawing their management-organization charts, tightening up lines of authority and responsibility, seeking talents and facts to speed production and sales, and focusing a multitude of skills on each of their problems. These companies aim at the most efficient use of manpower, machines and money. Their adaptation to today's needs promises to sustain them through their present situation and to provide a solid platform for launching coal into its brightest era.

The primary goal of the new look in management is strength for coal in the marketplace. From that strength naturally will come other desired results—satisfactory profits, full working time with good wages for employees, and long life for the company. To achieve the primary goal and the resultant good things, progressive management men are bringing their individual and collective skills to bear on six top problems:

Managing management.
Managing production.
Managing machines.
Managing manpower.
Managing markets.
Managing money.

Managing Management

UNDER TODAY'S COMPLEX CONDITIONS of mining and marketing coal, small companies in which one or two or three men once shouldered all responsibility and made all decisions, relying on their own experience and common sense, now must look to outside experts for help with their vexing problems. Larger companies, whose problems are even more complex and who seek to free their top executives from nagging details and ease their heavy burden, are delegating authority and responsibility to officials farther down the line and setting up sources for information to guide the men who must make the big decisions.

Modern management-organization charts differentiate clearly between line and staff functions, with line officials carrying on the operations for which the company exists—production and sales—and with staff officials providing services and facts that speed line functions. On the chart for a fairly large, well-organized company, shown in the accompanying illustration, a vertical relationship of decreasing authority and responsibility applies from the president through intermediate officials down to face foreman or lower-rung sales supervisor, as the case may be. For staff officials, connecting lines on the chart show where services are rendered, whom facts and recommendations go to, and how line and staff officials work together. The chart of a small company, in which highly specialized skills and services are not available among existing line and staff officials, will be a great deal simpler. To fill its intermittent needs for special help, the small company today relies on professional outside consultants who, for a reasonable fee, offer help on certain engineering problems, preparation, training, market research and advertising.

Whether the company is large or small, however, the principles of good management organization are the same. In brief, they are as follows:

1. Duties are clearly stated for every management official from the president down.

2. Every management man knows who his superior is. He reports only to his superior.

3. Wherever responsibility is assigned, commensurate authority is delegated.

4. Line officials determine policy, make decisions, give orders and supervise performance. Staff officials provide services, information and recommendations to guide line officials.

5. Line and staff relationships are so set up that all helpful skills can be brought into focus on every problem.

6. Men down the line are given opportunity to develop their talents for promotion up the line.

7. Compensation is commensurate with responsibility and comparable to compensation for similar positions in other companies.

Twenty years ago, when handloading was the accepted method of mining coal, the section foreman had a fairly simple job. He played the role of safety policeman and inspector and kept his crew supplied with track materials, timber and mine cars. Tonnage rates provided most of the incentive for his workers.

Today, however, the section foreman is responsible for the use of $100,000 to $125,000 worth of machines and equipment and the performance of a crew of highly-paid machine operators. He must know at least the rudiments of mechanical and electrical engineering and the details of state and federal mining laws. With the day wage prevailing and other incentive lacking, he must provide the personal leadership that inspires loyalty, co-operation, safety and

high efficiency among all his workers.

That's why forward-looking coal-company management today selects its section foremen painstakingly, trains them carefully, delegates responsibility and authority to them, backs them up with equipment and services, takes them into its confidence and keeps the path open for their advancement to better jobs.

Managing Production

WITH MARKETS SHIFTING and with demand by some users at a low ebb, today's emphasis in coal production is not on total tons per day but on tons per man per day; not on quantity but on efficiency. In these times, a company must match its output to a sluggish market without any increase in costs per ton—or with a decrease, if possible.

That's a hard problem to solve.

But some companies are solving it. Here's how:

Matching Output to Market — One company, detecting through its sales department a shifting pattern of coal consumption, recently bought a mine to round out its pattern of coals. Thus it equipped itself to enter a new market and, at the same time, created a hedge against possible declines in demand for coals already being produced. With an additional mine and a new kind of coal, the company redrew the boundaries of its sales territories, added new salesman and intensified its sales efforts. The results: That company in 1953 produced and sold more coal than in 1947, a distinction shared by only 25 commercial companies producing over 1,000,000 tons per year.

To mark up this accomplishment, the company called on the following skills, collectively and individually:

1. Market-research and sales skills, which kept tabs on market trends, uncovered potential new customers and, by intelligent and helpful service, sustained demand at a good level.

2. Combustion engineering, which tested the company's various coals and matched them to various markets and types of burning equipment and thus, while giving better service to old customers, brought in new users for the company's coals.

3. Traffic engineering, which sought out the cheapest and most suitable ways of shipping coal to users and revealed, by a study of shipping routes and costs, what territories the company could enter profitably.

4. Mining engineering, which surveyed and appraised prospective new properties before narrowing down to the final choice and which estimated probable development and operating costs, reserves of coal, and the machines, equipment and manpower needed to develop the mine and keep production going smoothly.

5. Financial and legal skills, which found the money to buy and equip the new property and wrote the legal papers transferring the new mine to the company.

6. Personnel management, which found supervisors and workers to man the new mine.

Many of the same skills were called into play when an Illinois company, faced with the need for drastic action, recently decided to close a mine as a way of matching output to market. Facts and advice from several sources preceded the final decision to close the mine. Top executives put it up to market-research and sales experts to analyze trends showing which of the company's products had the weakest market outlook; to financial and accounting experts to determine prospects for successful liquidation of mine and equipment; to combustion engineers to find whether, as an alternative to closing, coal from the mine in question could be converted to other uses and markets; and to mining engineers to advise whether a closing could be done in such a way that the mine could be re-opened if and when demand picks up. Acting on facts and recommendations submitted by these men, top officials picked the mine least likely to survive profitably and decided to close it rather than sell it.

In short, as the experience of these two companies shows, one secret of successfully matching output to market lies in the integration of the skills of many different men.

Achieving Low Cost With Low Tonnage—In the American system of mass production, it's an almost inflexible rule that to bring unit costs down, a producer must turn out more units.

But the big job of coal-company management today, from president all the way down the line, is to turn that rule upside-down; that is, to hold the line on costs, or actually to cut cost, while producing fewer tons.

What some companies already have done along that line and what they and others can do in the future is the substance of *Coal Age's* recent series of articles on cost-cutting. Titles and dates are as follows:

"Cutting Cost—What's Needed . . . How to Do It," January, 1953, p 72.

"Efficiency—Machine-Made," May, 1953, p 86.

"How to Use Modern Materials and Equipment," July, 1953, p 66.

"Cutting Cost in Stripping," September, 1953, p 72.

"Cutting Cost at the Face," November, 1953, p 70.

"Cutting Cost Behind the Face," January, 1954, p 54.

"How to Produce Quality Coal at Low Cost," March, 1954, p 54.

"Cutting Cost With Safety," May, 1954, p 70.

"Maintenance for Lower Cost," July, 1954, p 50.

By and large, the principles voiced in this series can be summed up somewhat as follows:

1. Muster all the talents and ingenuity of the management group for an all-out assault on costs.

2. Set goals for cost-cutting in all operations and departments.

3. Systematize the search for cost-cutting machines, equipment and methods.

4. Invest in machines and equipment that promise to lower cost.

5. With a critical eye, scrutinize all machines, equipment, supplies, cycles, methods, procedures and processes for opportunities to cut cost.

6. Provide the services—maintenance, power, drainage, ventilation, transportation, supplies, safety and others—that are needed to raise tons per man-day.

7. Keep men and machines busy.

8. Develop manpower to its highest potential through close supervision, training and safety.

In a cost-cutting program, here are the leading actors and the parts they play:

Top management, including president, vice president for operations and general manager—Establish a clear-cut cost-cutting policy, set up economy goals and emphasize and promote cost-cutting; provide the machines and equipment that will bring costs down; employ able middle-managment men, inspire them and back them up; and find the money needed to mechanize and modernize operations.

Middle management, including general superintendent, superintendent, and mine manager — Employ competent supervisors and back them up in cost-cutting efforts; keep costs under analysis; set up operating practices and standards aimed at keeping

efficiency high; check on purchase and turnover of supplies and materials; watch for new labor-saving equipment and new mining methods; and correlate staff services with the needs of line operations.

Front-line management, including mine foreman, pit foreman, shift foreman, tipple foreman, outside foreman and section foreman—Put cost-cutting plans to work; keep immediate superiors informed about up-coming needs for equipment and supplies; observe schedules for maintenance of machines and equipment; guard against waste of supplies; keep men and machines busy; prevent abuse of machines; and think up and suggest kinks, gadgets and methods to raise tons per man-day.

Staff officials—The chief financial officer holds the purse-strings and keeps expenditures under control. The purchasing officer seeks the best bargains in machines, equipment and supplies in terms of efficiency, durability and price. He also guards against top-heavy and costly inventories of supplies, parts and materials. The chief engineer, working with and through the electical engineer, the mechanical engineer, the chief electrician, the master mechanic and the construction foreman, is watchdog over the cost of services rendered by the staff men under his supervision and, at the same time, seeks ways to improve mine layout, machine maintenance, transportation, power distribution and other services to obtain more tons per man-day.

Managing Machines

WHICH MANAGEMENT MEN play top roles in the management of machines?

Managing machines begins with the decision to buy. After that, there come the twin problems of use and maintenance.

On any question of big capital expenditure, the president makes the decision to buy or not to buy.

But the president must lean on other men—men within his own company or consultants from the outside—for help in deciding whether to buy or not to buy and in making the investment pay off if he does decide to buy.

Take, for example, an Ohio company that recently made a seven-figure dollar outlay to replace old equipment with modern, high-capacity stripping machines and haulage units. Who contributed what to the decision to buy and the success of the venture?

Apparently, it went something like this:

Sales Manager and Market-Research Director—Studies indicated a potential market adequate in size and long-lived enough to justify the seven-figure investment. On the assumption that the new equipment would cut costs substantially, study of the price situation and outlook indicated a good chance for a fair profit.

Chief Financial Official—With dollar reserves set aside from profits in former years, with a good credit rating to back up a request for a bank loan and with profit prospects assuring repayment of any loan, the financial expert could give a go-ahead as far as his department was concerned.

Chief Engineer—Performance and cost studies by the engineers indicated that the proposed new equipment would lower costs to levels that would give the company's coal a measurable price advantage. Their studies and designs showed how savings would be made and what changes would be needed in stripping methods, auxiliary equipment, working cycles and manpower to exploit the full potential of the new equipment. Pit design and haulage roads were planned to accommodate the new equipment and minimize terrain difficulties.

Operating Officials—Having watched over the shoulders of engineers who drew plans for best use of the new equipment, operating officials put the newly bought equipment to work. Wherever "bugs" showed up, operating men and engineers, working together, cleaned them out. Wherever advance plans were stymied by realities, adjustments were made. Cycles were set up to obtain maximum operating time. Auxiliary services, including power, drainage, road maintenance, high-wall preparation and communications, were geared to the needs and capacity of the new equipment.

Master Mechanic—Upon the master mechanic fell the task of keeping machines, plant and equipment in first-class operating condition and stretching useful life to the maximum. To help him with this task, acting on the recommendation of the chief engineer and top production officials, the company provided adequate enclosed floor space, labor-saving tools and materials, ample spare parts, facilities for keeping records on overhaul and repair, and skilled specialists, such as welders, machinists, metal workers, carpenters and mechanics.

Chief Electrician—The electrical department shares with the maintenance department the job of keeping equipment working smoothly at top efficiency. On some projects—for example, maintenance of a shovel or electric drill—the two departments work hand-in-glove. In addition, the chief electrician must provide proper voltage wherever it's needed—shovels and draglines, pumps, drills, the preparation plant, etc.—and obtain the best service possible from transformers, m-g sets, substations, cables and other electrical equipment.

Personnel and Safety Directors—To these two staff officials falls the task of providing men to operate the machines and equipment, training them up to job specifications, and devising guards, protective installations, work methods and operating rules that ward off accidents.

Managing Manpower

MANPOWER COSTS A LOT OF MONEY. Even when working at top efficiency, it's the most expensive item in the cost of coal. That's why well-managed coal companies direct much of their planning and energy to high-level and ever-improving performance by rank-and-file workers.

In this phase of management, as in others, line and staff officials work in accordance with policies established by the president. But policies are put into effect and manpower actually is managed by the superintendent and his front-line aides, the foremen. At the superintendent's beck and call are staff experts on personnel and safety. Under his authority and responsibility and by his direction, workers are hired, trained, assigned to jobs, supervised and guided in their work, guarded from danger, rewarded, disciplined, laid off or fired.

As at higher management levels, clear lines are drawn between line and staff functions, with personnel and safety departments providing counsel, recommendations and services (such as job training, safety training and promotion, inspection, statistics, etc.) and with line officials—superintendent and foremen—executing orders from higher line officials, coordinating staff services with the needs of workers and machines, acting on recommendations from the staff and enforcing rules and regulations.

In smaller companies, the superintendent alone sometimes has to carry staff as well as line responsibilities in manpower management. Doubling or tripling in brass as manager of production, personnel and safety, he's a busy man and, to succeed, must be a skillful man.

But whether the company is large or small, good management today is more than ever awake to the compelling need for workers who will do their best. To obtain that kind of manpower is modern management's job—to employ men wisely, provide them with the best in machines and materials, equip them with the skills to get the most from machines and materials, remove the obstacles that frustrate the instinctive desire to excel, earn their loyalty and cooperation, and provide the front-line leadership that inspires the best that's in them. That's why progressive coal companies today stress the human factors in manpower management, strive for better foremanship at the face and give new and bigger stature to safety and personnel officials.

Managing Markets

CAN COAL MARKETS BE MANAGED? That is, can their behavior be forced into the pattern desired by a coal company?

Not 100%. But that doesn't mean coal-company management must throw up its hands in despair.

For instance, take a West Virginia company. In 1953, its production and sales ran nearly 20% higher than in 1947—the reverse of the over-all trend in the industry. It achieved that record, and to that extent managed or controlled its markets, not only by improving mining methods and product quality, but also, with courage and optimism, by enlarging its sales staff and putting muscle into its sales efforts.

That company's record shows how an alert and determined management can swing weight in the fuels market.

Here's how a company can manage markets:

Market Research—Not enough companies know the full story, or even a substantial part of the story, about who buys their coal, what their coal is used for, what their customers like or dislike about it, what kind of burning equipment customers have, where potential users are building new plants, how markets are changing or what rival fuels are doing.

Market research reveals these facts and others and thus provides opportunities to sell coal and keep it sold, to satisfy customers' wants and needs, and to be on the scene, ready to fight, when rival fuels try to establish a beachhead among coal users. Market data will not solve all of coal's marketing problems but they will help.

Market research is so expensive that only a few of the biggest coal companies can pay for anything remotely resembling an adequate job. The fact remains, however, that individual companies, whether large or small, can improve their market information measurably and thus gain some control over their sales by: (1) directing their salesmen to seek out more facts about old customers and prospective users of coal, new construction projects, plans to switch from coal to oil or gas, performance of burning equipment, relative prices of competing fuels and the views of men who select fuel and burning equipment for institutions and industrial plants; and (2) banding together with other companies, locally or regionally, to share the cost of collecting market data.

Sales and Service—Modern coal-sales management must reflect today's buyer's market in fuels. A management that is geared to present needs selects its salesmen carefully; trains them in salesmanship, combustion engineering and related subjects, even at the cost of sending them to special schools; and backs them up with service to customers.

A midwestern company, for instance, recognizing the growing use of coal as an industrial and utility fuel and the shrinkage of markets that formerly were dependable, recently reorganized its sales department. It took on a new sales chief, employed and trained a new corps of salesmen as specialists in industrial sales and, while closing mines that produced coal for which demand was mostly seasonal, drew up an exclusive sales agreement for an industrial coal that can be shipped by low-cost barge to major steam markets. That way, the company expects to cash in on the new opportunities created by a changing market.

Not every progressive company is following exactly the pattern above but all progressive companies are accepting the fact that selling coal in today's market is a job for specialists. That explains why some companies have created independent or subsidiary organizations to sell coal and service customers, or have turned their sales over to established shippers or brokers. And it explains why other companies, here and there, have pooled sales, engineering and promotional skills into flying squadrons of Minute Men, now serving as fast-moving watchdogs over coal's commercial and small industrial markets in some parts of the Midwest and elsewhere.

In addition, modern management also is accepting a sounder concept of selling. Today, and for a long time yet to come, coal companies must sell their product not only on the basis of price and quality, but service as well. That's why sales managers now are training their salesmen in the rudiments of combustion and utilization and enlisting the help of their own engineers, outside consultants and the experts of equipment makers to make coal a more satisfying fuel.

Advertising — Having mechanized mining operations, the best-managed coal companies today are mechanizing their sales through advertising. In other words, they are putting advertising into its proper role in the six steps of selling. Those steps are as follows:

1. Contact your prospect and sustain the contact.

2. Arouse and maintain interest in your product.

3. Create and build a preference for your product.

4. Make a specific proposal.

5. Close the order.

6. Keep your customer sold.

Modern sales management entrusts the first three steps to advertising, thus warming up the prospective customer and assuring the salesman a hearing when he makes his call. Steps 4 and 5, making the proposal and closing the order, fall to the salesman alone but they are easier for him because, with advertising having paved his way, he is free to concentrate his efforts where they count most—consummation of the sale. In accomplishing Step 6, salesman and advertising work together.

Does well-managed advertising pay off?

There's no exact yardstick for measuring the pay-off in advertising. But one set of facts does throw some light on the merits of mechanized selling through advertising. In 1953, according to *Keystone Coal Buyers' Manual*, 59 commercial bituminous producers mined and sold over a million tons. Of these, only 25 produced and sold more than in 1947. Those 25 companies used a total of 34 pages of advertising in the 1947 *Keystone;* in

the 1954 *Keystone*, 55 pages. That was an increase of 61%. These figures are in contrast to the remaining more-than-a-million-ton commercial producers, whose advertising in *Keystone* increased only 8% in the 1947-54 period and who, at the same time, produced and sold less coal in 1953 than in 1947. Thus, though advertising admittedly is not the only factor that tips the scales in favor of growth or decline, the kind of courage that advertises in a shrinking market is the same kind of courage that makes a company grow in troubled times.

Managing Money

COAL-COMPANY DOLLARS ARE SCARCE these days, and hard to come by. Management of these dollars can spell the difference between shoestring survival, or even bankruptcy, and confident advance into the years ahead. Without overlooking any opportunity to pinch a penny or squeeze a dollar, today's successful money manager is not as much miser as dollar-driver, a financial taskmaster who makes the company's dollars work harder.

Good money management requires top-grade skill and judgment. Here, for example, are some of the manifold problems a coal-company financial official must deal with, directly or indirectly:

Prices.
Profits or losses.
Expenditures for machines, equipment and plant.
Purchase of coal lands.
Taxes—federal, state and local.
Accounting procedures, which often can effect tax savings.
Budgets and budget control.
Working capital.
Borrowing money.
Paying off debts.
Stocks and dividends.
Investment of reserves and surplus monies.
Trust accounts, like social security and the welfare fund.
Sale and liquidation of property.
Insurance.

Can skillful money management help a company?

The answer is "Yes."

Look, for instance, at the recent record of one of the anthracite companies. Earnings in the first quarter of 1954 approximated $425,000, against a loss of about $375,000 in the same period a year ago. Improvement in the financial position of the company came from higher productive efficiency, a stronger sales effort in all markets, disposal of some properties that were not paying their way, and sound management of money.

Using part of its income from coal sales, plus proceeds from the sale of unprofitable properties, the company has reduced its debts to banks from about $5,200,000 to some $2,300,000. The result: An estimated saving of over $100,000 per year in interest charges alone.

Take another example of good financial management, this one in the Southern field. In 1953, the company spent over $7,000,000 for new construction and equipment. That was about $4,500,000 more than in 1952.

Where did that money come from? It came mostly from net current assets which, from 1952 to 1953, were drawn down from $16,000,000 to $10,000,000. Nearly $5,000,000 of the total $7,000,000 spent reappeared, however, as an increase in fixed assets, so that net reduction of total capital assets was only $2,000,000. The $5,000,000 of new fixed assets will be recovered through depreciation over a period of years. Meanwhile, the $2,000,000 net reduction of capital assets eventually will be replaced through added profits made possible by economies growing out of the $7,000,000 expenditure. Helped along by new construction and equipment, the company realized 3c per ton more on the sale of coal than in 1952. Thus, with production of nearly 6,000,000 tons in 1953, the $2,000,000 net drawdown of capital assets in 1953 paid off $180,000 in a single year. With this strong position, created by skillful financial management, the company recently has negotiated a big bank loan to complete its 1949-55 program of modernization.

The principles and procedures of money management are much the same, regardless of company size, though the problems of a small company may be somewhat less massive and complex. The principles are these:

1. Keep your financial condition under continuous survey.

2. Dispose of assets that are unprofitable and show no chance of becoming profitable.

3. Set aside money from your earnings to draw on for emergencies and expansion of operations.

4. Set aside depreciation and depletion funds for re-investment, as needed, in equipment and property.

5. Sell no coal except at a price that provides a fair profit for you.

6. Follow accounting procedures that minimize your tax liabilities.

7. Maintain your credit rating by meeting your obligations promptly.

8. Don't hesitate to borrow money when you need it, as long as you can see your way to pay it back and show a net gain over and above interest charges.

9. In seeking a loan, try to pick a time when interest rates are low, usually in the summer. For example, on a $100,000 loan, a difference of ½% in the interest rate adds up to $500 in a year's time.

10. Pay back borrowed money as fast as possible.

11. Don't hesitate to spend money to make money.

12. Call on professional money managers for counsel and help. If your company is small and you don't have a professional money man on your staff, ask your banker. Managing money is his business.

Looking Ahead

MODERNIZED MANAGEMENT, as described in the columns above, is making headway against today's obstacles and discouragements by seeking the best from company officials up and down the line

In these perplexing times, this kind of management guarantees a company that it will pull through the next few years in strength, if not in prosperity. It keeps coal up front in the energy market. It creates a climate that will speed the arrival of coal's brightest era. And last but by no means least, it assures the Nation of standby strength in time of peril.

While wrestling with today's problems, modernized management at the same time is preparing, perhaps unwittingly, for the long years ahead when coal will cross the threshold into its bigger future. For that time, progressive coal-company management now is developing the following resources:

1. A pattern for building an industry strong enough and big enough to meet tomorrow's energy needs.

2. A competitive strength that will meet conventional energy sources and new ones—perhaps nuclear and solar energy—on a better footing than that with which coal now meets oil and natural gas.

3. A management skill which, having solved the problems of lean years, will turn with confidence to the complexities of production, distribution, sales and technology in a period of massive demand.

"Our new Will Scarlet mine reflects our continuing faith in the future of bituminous coal."

"In those days, we could keep a profit." Mr. Sherwood's son, S. F., Stonefort president, is impressed by such an economic climate.

The Sherwood Story

ROBERT HARTLEY SHERWOOD, chairman of the board of the Stonefort Corp., helped pioneer modern coal stripping 42 years ago at a time when courage, vision and enthusiasm were even more necessary than today. The courage has not waned, the vision is as keen and the enthusiasm has not diminished over the years, and today Mr. Sherwood continues his pioneering career with his new Will Scarlet mine, in Williamson County, Illinois, near the town of Stonefort, described by A. E. Flowers, associate editor of COAL AGE, in the story following this report by Mr. Sherwood on the problems and accomplishments of his career to date.

As the new Will Scarlet mine has several unique features, and as it is unusual for a veteran coal operator, as Mr. Sherwood undoubtedly is, to open a new mine with a potential capacity of approximately 700,000 tons a year at a time when so many other mines are going out of production, COAL AGE naturally was interested in presenting the details of the operation, and also in the thinking and background leading up to the development of the new property. Mr. Sherwood kindly agreed, and his account of his career, and of the operating techniques he has evolved, as told to Mr. Flowers, follows.

42 Years in Coal Stripping

DANVILLE THE START

My advent into the coal-stripping branch of the bituminous coal industry took place in the latter part of 1912. Prior to that time I had been employed by a large general railroad contractor with offices in New York City. Fortunately for me, I became acquainted with Mr. W. G. Hartshorne, a very capable and enterprising coal operator, who was operating a small shaft mine near Danville, Ill.

There happened to be located in and around the City of Danville considerable areas of coal lying anywhere from 20 to 35 ft below the grass roots. At that time, steam-operated power shovels were just coming into use. There were a few small steam shovels being made that operated on a circle rail and were self-propelled on power-driven cast-iron tractor wheels. The novel feature about these little shovels was that the upper frame could make a complete circle.

These first steam shovels were little affairs, carrying buckets with about 1 to 1½ yd capacity, and were used chiefly by general contractors for loading dirt into horse-drawn wagons.

THE HARTSHORNE IDEA

At the time I met Mr. Hartshorne, he had evolved a very important and revolutionary idea and that was to see if he could not get some manufacturer to make a much larger, completely revolving shovel than had heretofore been made. He prepared a set of specifications of what he thought could be built. What he asked for was a steam-operated completely revolving machine with a 3½-yd bucket and a 40-ft boom. When I first met Mr. Hartshorne he had just received delivery of and erected a shovel built to these general specifi-

"A revolutionary idea . . . a completely revolving shovel with 3½-yd bucket and 40-ft boom . . . based on price per pound."

"Mr. Hartshorne and I sweated out the flood in 1913 . . . our shovel was covered."

cations, in a river bottom near Danville on a site where there was a 7-ft vein of coal overlaid by some 20 to 30 ft of shale and gravel.

In getting this shovel made, the builders, the Marion Steam Shovel Co., of Marion, Ohio, who had reluctantly undertaken to design and build this machine, had stipulated to Mr. Hartshorne that a shovel of the kind that he wanted possibly could not be made strong enough to stay together, and that in no event would they undertake to build it with any guarantees as to performance. They did, however, agree to do the best they could to meet his specifications, without guarantees of any kind, and inasmuch as it was going to be very difficult for them to quote a price on such a "massive" heretofore unknown piece of equipment, they proposed that the price to be paid should be based on a price per pound f.o.b. factory. But Marion meant "its best," and produced a machine that lived up to expectations.

Mr. Hartshorne was not a man of large means—no operators of shaft mines were particularly affluent in those days, but nevertheless, he had scraped up enough money to make a substantial advance payment. As I said before, when I arrived in Danville, the shovel had just been set up and had opened a box cut about 1,000 ft long, and the production of coal for the commercial market had just started. The coal was loaded with hand shovels on small 36-in-gage mine cars drawn by mules.

As Mr. Hartshorne's finances were quite low, he was offering to sell, to friends and neighbors, stock in a corporation that he had organized to exploit his new and revolutionary method of stripping coal. I was so impressed with his personality, as well as his new ideas, that I availed myself of the opportunity to acquire some stock in his new corporation. But my offer to buy stock was accompanied by the condition that I take an active part in the operations. Accordingly, it was agreed between us, that I resign my job in the east, move my family to Danville, and go to work for the new corporation.

THE FLOOD CAME

Those who are old enough to remember what happened in the following year, 1913, will know it was the year of one of the greatest and most devastating floods that ever occurred in the Ohio valley. I moved my family to Danville in February, 1913, and in March of that year the flood came. After several weeks of incessant and torrential rains, our new shovel was sitting in our pit entirely covered by water, only part of the point sheave on the boom was sticking out above a huge lake of muddy water to indicate where our precious shovel was located.

In 1913 centrifugal pumps were not available. All the pumping we did was done by reciprocating pumps operated by steam engines and portable steam boilers. At any rate, I was in the coal business, and Mr. Hartshorne and I sweated it out. It took us, I think, 5 mo to repair the levee which we had erected to keep the water from the neighboring creek out of our pit. This we had to do with slip scrapers and mules. We then had to just sit down and wait until we pumped out the lake left behind the levee that must have covered 100 acres of land 20 ft deep. Being a young man, I was not too discouraged, but I have never ceased to admire Mr. Hartshorne's courage and grit in going through this heart-breaking disaster, he and I both having practically everything we owned in the venture. However, by fall, we had the pit cleaned up and were ready to load coal for the next winter's burning season.

That initial mine eventually turned out to be exceedingly profitable and it was from that beginning that I began to mine coal by the strip method and I am still doing so.

OPERATING THE HARD WAY

I think it might be interesting to note at this point that in those days we had no easy welding technique. Steel fabricating was done entirely with rivets. Holes for rivets were drilled by hand-operated ratchets. We cut rivets off with cold chisels and sledges and backed them out by the use of a punch and a sledge hammer.

I remember that I had to argue with the mine superintendent to get him to use an acetylene welding torch. I mention this, because I think it will help my younger friends in the industry to appreciate how blessed they are with electric welding torches and other power tools. We had to use more man power, but this disadvantage was offset by a UMW wage scale of $2.32 for a 8-hr day. We had another advantage in those days because, when we made a profit, we could keep it. It was in 1913 that I saw the first income tax form. It was printed on one side of a letter-size sheet and called for a federal tax of

"The first sidewall drill was a crude affair but it worked — a straight hole 60 ft deep."

1% on net profits. Of course federal capital gains taxes had never been thought of.

This is no time to go into details about my sojourn in Danville. Suffice it to say that Mr. Hartshorne and I were associated together there in operating strip mines for the ensuing 7 yr. During that time we gathered together other shallow pieces of coal and started a group of small strip mines, five all told. Our general technique was to borrow all the money we could, start a mine, pay its debts, and then start another.

We wound up in 1918 owning a stock interest in five different mines in and around Danville, with one exception. One of our best mines was located in Eastern Ohio not far from Wheeling. It was in that year we had a chance to sell out our entire holdings to a man representing eastern capital at, to us, a very advantageous price, and it was with a great deal of satisfaction that Mr. Hartshorne and I were able to pay a large group of small stockholders, largely citizens of Danville, a liquidating dividend representing a very substantial profit, approximately 100% on their original investment, over and above substantial dividends paid during the intervening years. The group of mines that Mr. Hartshorne and I sold at this time has now grown to be a very large company known as the United Electric Coal Cos., operating chiefly in Illinois.

GOING IT ALONE

It was in 1917, a year before this sale was finally consummated, I opened my first independent strip mine, located in Sullivan County, Indiana, south of the town of Dugger. Here I was my own boss, for my sister and I were chief stockholders. We named that mine Robin Hood. It might be of interest to note here why I have always named mines that I have opened during the years, after characters in the well known legend of Robin Hood. Our eldest son at that time was a little boy 8 yr old. His family nick name was Robin. He had a beautifully illustrated book by Howard Pyle, telling the story of Robin Hood. In his childish mind, he though his name, Robin Sherwood, closely connected him with the descendants of the Robin Hood of Sherwood Forest.

His intense interest in this supposed relationship gave me the idea of naming our first mine after the chief character in the Robin Hood legend. Through the years I have opened and operated seven mines, all named from these legendary characters. The list is:

*1. Robin Hood I, II, III
2. Allendale
*3. Friar Tuck
4. Nottingham (For Sheriff of Nottingham)
*5. Little John
6. Maid Marian
*7. Will Scarlet

Those marked with an asterisk are the ones we are now operating. The others have been worked out and closed.

You have asked me to tell you of some of the new techniques that we have introduced in the 37 yr since I started out for myself. When I opened my first mine, Robin Hood, we were fortunate enough to start coal production in 1917 during World War I, when coal was in great demand, and the coal operators had no trouble in selling a car of coal as long as it was black. I realized, however, that the analysis of that coal was atrocious. The coal was Indiana No. 6 vein, which carries a thick dirty band of clay. This clay all went into the screenings, with resultant excessively high ash.

PREPARING FOR THE BUST

Being sure that the boom in the coal market would not last, I decided to get ready for the bust, which, of course eventually came. I learned that an engineer by the name of Elmore was washing anthracite coal in the east, so I went to see Mr. Elmore, in Philadelphia, and managed to induce him to undertake to design a washer to wash bituminous-coal 1¼-in screenings, something he had never done. I could see no reason why, if he could wash anthracite successfully in his Elmore jigs, the same jigs could not successfully wash bituminous coal. Mr. Elmore was very

"Freezing of coal in the cars was something I had not foreseen. Heat drying was the answer."

busy—the coal business was good in the anthracite field as well as the bituminous coal field, but he reluctantly consented to send one of his engineers out to Sullivan where we had our principal office and help us construct one of these Elmore jigs in a little three-track wooden tipple that we had built to serve this mine.

The end result of this move was a very satisfactory jig with a wooden tank in which the coal was agitated by mechanical plungers operating off an eccentric shaft. A few months after we got the jig built and ready to run, the market broke, as I had predicted, and the ability to take the excessive clay out of our 1¼-in screenings made it possible for the mine to continue operating.

At the time this wet washer went into operation, it was the only mine washing coal in the Middle West. As I remember it, a wet washer had been constructed in Illinois. The owners had planned to buy dirty screenings which they hoped to clean up and resell at a profit. The plan failed, however, and this washer, which I believe was located at Benton, Ill., was at that time standing idle.

At that time there was also, if my memory serves me correctly, a washing device in use for washing bituminous coal, near Birmingham, Ala., known as the Montgomery Basket Washer. I never saw it work but remember photographs of it.

It was in 1928 that the Link-Belt Co., of Chicago, acquired the right to make and sell a washer then being built in England, and known as the Simon-Carves washer. It was the first washer built in this country using compressed air to pulsate the coal bed to separate the coal from the refuse. This use of air to lift the jig bed was a great improvement over

the plunger type as it provided much more flexibility of adjustment, and is widely used in this country where water is the washing agent. The old plunger type of agitator is obsolete. We put in the first of these Simon-Carves washers used in the United States, at our Allendale mine. Maybe this might be considered introducing a new technique.

WATER AND WINTER

We found this method of cleaning screenings worked all right in the summertime, but when cold weather came, another problem presented itself, which was the freezing of coal in the cars. This was something I had not foreseen. Anthracite coal, being hard, permitted the water to drain out, whereas, bituminous coal, being somewhat absorbent, retained enough moisture to cause the coal to freeze solid in the bottom of the cars.

We struggled along, using salt and calcium chloride in the bottoms of the cars for a few years, but after several very cold winters and many customer complaints, I began to cast around in my mind as to how we might dry out coal after washing it.

I found that there was a concern located at Netcong, N. J., who were builders of filtering equipment used in the chemical industry. They had developed an apparatus known as a sintering machine. It was called the D-L-O, built by the Oliver United Filter Co. The initials D-L-O were derived from the initials of the owners of the patent on this machine, Messrs. Dwight, Lloyd and Oliver.

The original purpose of this apparatus was to sinter very fine ore which otherwise would be lost. The plan of this apparatus basically consisted of square trays with perforated sheet-iron bottoms with holes about ⅛ in. These trays ran on rollers through an enclosed chamber through which hot air was blown, the air being hot enough to fuse together the very fine particles of iron ore into a sinter that was large enough to be handled in a blast furnace.

I had the idea that this machine, with some alterations and with much reduced temperature, so as not to fire the coal, could be used to evaporate the excess water in fine coal. We interested the Oliver United Filter Co. in sending an engineer out to our mine and, eventually, we worked out a modification of their basic machine, using the furnace and duct work exactly as was used for sintering iron ore, simply substituting bituminous coal screenings in place of iron ore.

PROGRESS IN DRYING

We installed one of these machines just as soon as we could get one put in and that solved our freezing troubles. A little later, our own engineers worked out a device for drying coal which was much cheaper to build and required less maintenance. This was simply a tower in which we inserted sloping shelves. The wet screenings were elevated to the top of the tower, about 30 ft high, and cascaded from one shelf to another. Hot air was blown through the coal as it moved over these shelves.

We have both a D-L-O drier and one of these towers still operating satisfactorily at our mine in Illinois. This particular type of cascade drier has since been modified and improved by us, and is now on the market, and is what is known as the Baughman Verti-Vane Drier. There are somewhere between 50 and 60 of them in use in the bituminous mining industry.

I believe that the D-L-O drier was the first piece of equipment for drying wet washed bituminous coal, except possibly a drying apparatus of the rotary-kiln type. It was an extremely long cylinder which revolved slowly, tumbling the coal over and over in hot air as it turned, through the use of shelves in the interior of the drum. The initial expense of this drier and its maintenance was so great that very few of them were used in the coal industry. Furthermore, the tumbling action within the drum pulverized the coal excessively.

THE SIDEWALL DRILL

Another strip-mine technique developed by our organization was a horizontal drill for drilling overburden. At one of our mines we devised a method of boring horizontal holes 60 ft long, using the same type of coal auger that was being used in underground mines, and the same kind of mole-foot bit. We simply succeeded in hitching ten 6-ft augers together, rotating them with an electric motor and forcing them into the highwall with a drum and small wire rope operated by manpower. It was a very crude affair but it worked, despite the fact that I had appealed to a foremost maker of drill equipment to design such a drill, only to be told it was impossible to drill a 60-ft horizontal hole with sectional drills and keep it straight.

This device resulted in an enormous saving in explosives as against the then conventional method of drilling vertical holes in overburden. We patented it, but eventually sold the patent rights to the Sullivan Machinery Co., who redesigned the drill and put it on the market. This method of sidewall drilling is now widely used in strip mines. We were the first people to construct an apparatus that would drill a horizontal hole 60 ft long and keep the hole straight.

Mr. W. H. Stewart, general mine superintendent, and Mr. Walter Sutphin, pit foreman, should be given credit for great perseverence, because after many experiments and failures, they succeeded in rigging up their tools so as to be able to drill a straight hole 60 ft long with a sectional drill, after being assured by one of the largest drill manufacturers in the United States that it could not be done.

STILL PIONEERING

The most recent of the new techniques in strip mining that have been developed at mines under my management are those now in use at the Will Scarlet mine, at Stonefort, Ill. That mine is the first strip mine to use a stripping shovel with a special type of front end designed by the Bucyrus-Erie Co., whereby two seams of coal separated by 15 ft of shale can be mined simultaneously with one pass of the shovel.

It is also, to my knowledge, the first mine in which a simple cone type of storage pile over a conventional hopper is provided at the tipple site, whereby, without any additional handling, 5,000 tons of coal can be stored at the tipple. This technique permits the pit operation to be carried on an entirely different time schedule from the operation of the tipple, and by having a day's run of coal at the tipple, the operator is assured of no tipple delays waiting for trucks to come in from the pit.

This mine is also equipped with conventional sectional conveyor belts mounted on ties and following the general contour of the land, with no permanent foundations necessary. The coal is gathered in the pit in conventional end-dump trucks, and dumped into a portable hopper located at the end of the pit, from which the coal is fed onto the rubber belt and taken directly to the storage pile at the tipple.

This obviates the excessive expense of constructing and maintaining four-lane highways that are conventionally used for all truck haulage. It also reduces the number of coal trucks necessary. We believe that the storage pile at the tipple and the belt haulage will eventually become standard practice with all strip operators, because the saving in operational cost is obvious, and easily offsets the very slight initial capital investment.

Our new Will Scarlet mine reflects our faith in the future of bituminous coal.

SPECIALLY DESIGNED SHOVEL uncovers two beds of coal from one position. Stripper has longer boom than standard shovel and 26-yd dipper in place of 36-yd unit. Unit will work to 50-ft highwall above top seam.

TYPICAL BUSY SCENE shows horizontal drill units preparing for next cut while stripping and coal loading advance.

SIMULTANEOUS STRIPPING and loading of two seams is employed at Will Scarlet. Big shovel works ahead of loading.

Sherwood Pioneering History Continued at New Stripping

Will Scarlet Highlights:

Specially designed shovel uncovers two seams simultaneously

Overland belt eliminates long truck hauls

5,000-ton raw-coal storage pile smooths operations

By A. E. FLOWERS
Associate Editor, COAL AGE

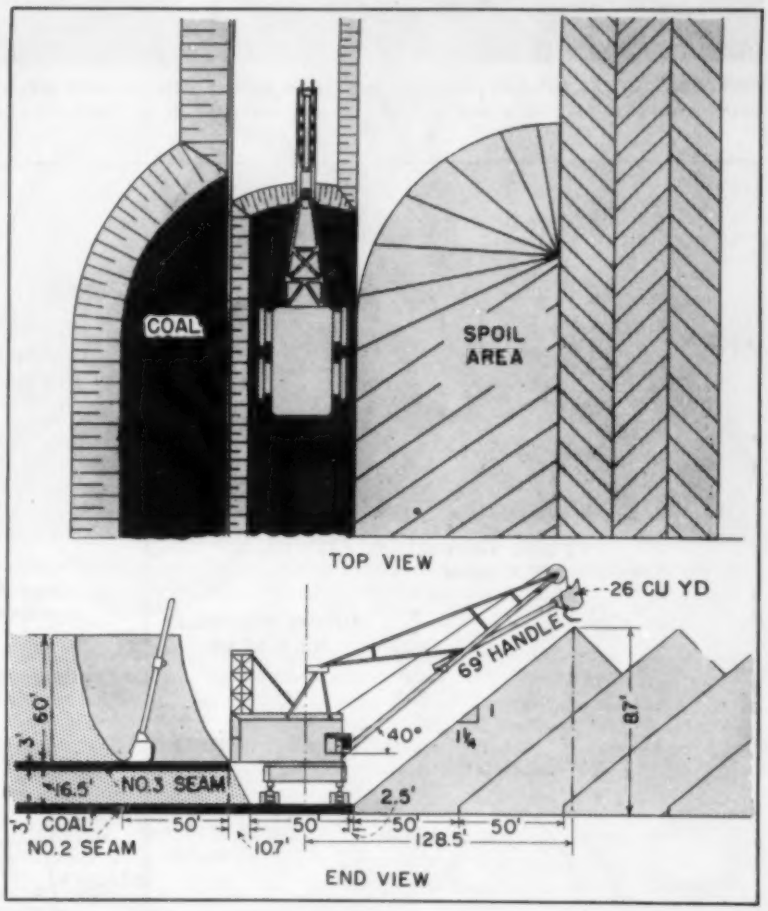
THE FIRST APPLICATION of an overland belt for pit haulage, a specially designed shovel for simultaneous stripping of two seams, and a 5,000-ton raw-coal stockpile are three foundations for efficiency at the new Will Scarlet mine of the Stonefort Corp., newest addition to the Sherwood stripping group. Selection of the new methods was the result of careful study by Stonefort management of the physical conditions in the area after it had been selected as the site for the new development.

MINING CONDITIONS

The Will Scarlet property is located in Williamson and Saline Counties, near Stonefort, in southern Illinois and is bounded on the north by the South Fork of the Saline River. About two-thirds of the property lies in Williamson County where stripping has been in progress since July 16, 1953. Topography in the area is very gentle undulating and the coal beds are present in a series of islands covered by up to 60 ft of overburden.

The No. 2, or Davis, and the No. 3, or DeKoven, seams are stripped simultaneously at Will Scarlet. Starting at the surface, the overburden over the No. 3 consists of 10 ft of surface material and soil, and 10 to 50 ft of sandstone. The No. 3 coal averages 3 ft in thickness and has a 3-in parting of hard shale in the middle. It is underlain by 6 to 16 ft of gray shale. A 2-ft layer of black shale separates the gray shale and 3-ft bed of No. 2 coal. There are no partings in the lower seam, which is underlain by a firm fireclay.

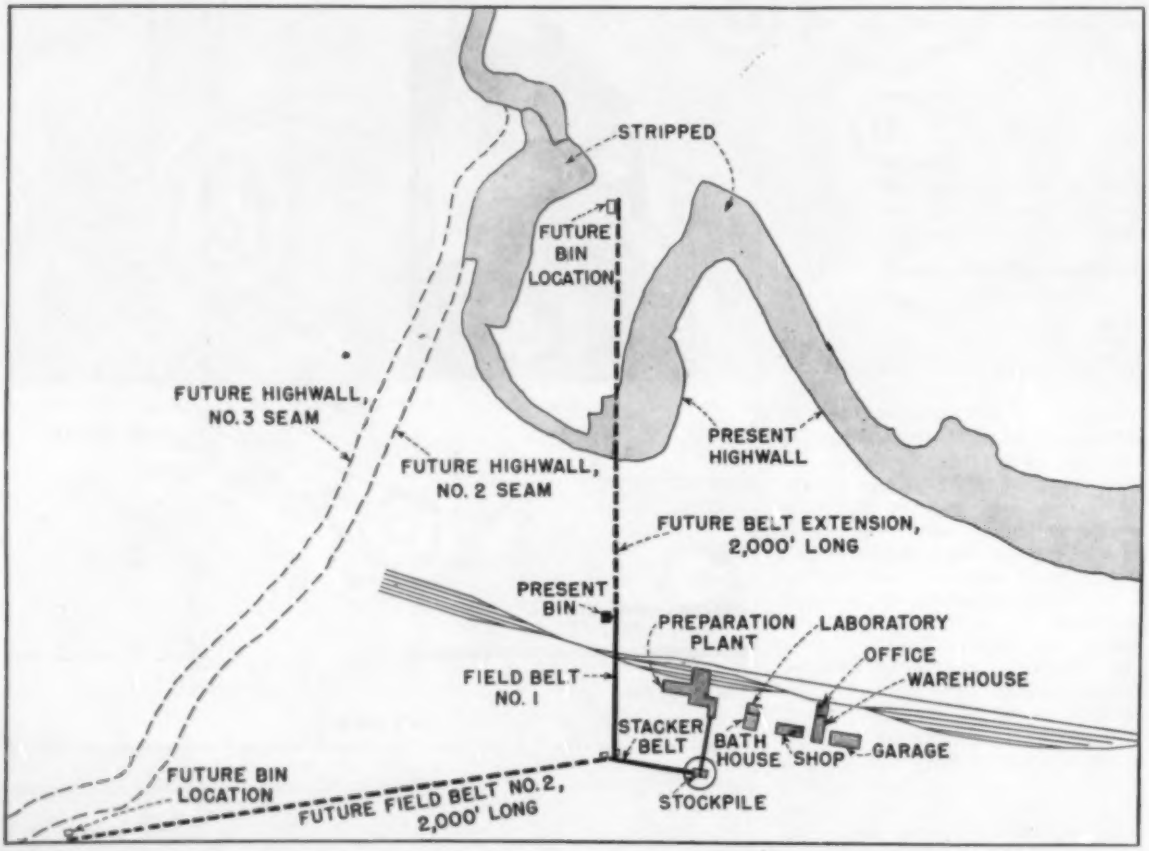
Coal moves to markets by rail and by a combination of rail and barge. The NYC R.R. serves the mine and carries the coal to Joppa, Ill., where the C&EI R.R. operates barge-loading facilities. From this point, the coal moves by barge to various TVA plants as well as to other points on the Ohio and Mississippi Rivers.



HOW THE SPECIALLY DESIGNED SHOVEL handles the two-seam stripping.

PORTABLE STEEL BIN feeds overland belt system leading to preparation plant. Unit is skid mounted for easy moving.

OVERLAND BELT shortens truck haul to a maximum of ¾ mi. Conveyor system will be extended in 2,000-ft sections.



STONEFORT MINING PLANS—Coal will be recovered between the railroad and the present highwall as the first step in shaping the pit for the projected development. Then efforts will be concentrated in establishing a north-south highwall as shown above. Field belts will be installed in 2,000-ft units and truck haulage will never exceed ¾ mi.

BELT INTERSECTION between field and stacker units is 90 deg. Turning chute on overland conveyor loads stacker parallel to direction of travel. Belt system delivers 350 tph of coal to stockpile.

STACKER BELT elevates coal for stockpiling at the cleaning plant. Spiral lowers coal, preventing degradation. Feeder under pile deposits coal on 48-in belt for delivery to cleaning plant.

PRELIMINARY DEVELOPMENT

On July 16, 1953, a Bucyrus-Erie 200W dragline equipped with a 6-yd bucket began stripping the No. 2 seam outcrop preparatory to putting the specially designed Bucyrus-Erie 1050B shovel to work. The dragline removed overburden in 70-ft swaths and worked banks up to 40 ft high. Management's goal in the preliminary stripping was to uncover and remove the No. 2 coal back to the No. 3 outcrop and prepare a working bench for the big shovel. Operations were timed so that the No. 2 coal would be removed to the No. 3 outcrop by the time the 26-yd unit was erected and ready for taking over the job.

While the 26-yd shovel was being erected, construction of the preparation plant was moving forward and service buildings were rapidly being completed. To permit coal shipment during the preliminary stripping and construction period, temporary railroad loading facilities were installed adjacent to the preparation plant site.

CURRENT STRIPPING

On April 14, 1954, the 1050B moved into the pit and took over the stripping assignment. This specially designed unit works on top of the No. 2 seam while uncovering 50-ft cuts of coal on two different levels. An accompanying sketch (p 65) shows how the shovel handles the job. With this method of stripping, management reports that it will be possible to work banks up to 50 ft above the No. 3 coal.

Design features that permit the shovel to handle the two-seam stripping job include a longer-than-normal boom, installation of the saddle block farther out on the boom, additional counterweight and a 26-yd dipper in place of a standard 36-yd unit.

As the 26-yd shovel advances in the prepared bank, three self-propelled Parmanco hydraulic-feed horizontal drill units follow and bore 5-in holes in the highwall. One unit works on top of the No. 2 seam and the other two on the No. 3. Drills are equipped with Parmanco augers and Austin AP drill heads with AP

COAL CLEANING begins in the pit where bulldozer is shown removing fine dirt from top of lower seam.

STORAGE of 5,000 tons of raw coal in stockpile permits cleaning plant to operate without interruptions.

EAST VIEW of preparation plant shows stacker belt, lowering spiral and stockpile at left. Laboratory is in foreground.

ALL-METAL service buildings house complete shop facilities, supplies and engineering and supervisory offices.

2 drill bits. Holes are drilled horizontally on approximately 20-ft centers and 2-ft above the top of the No. 3 coal, and on 30-ft centers and 2-ft above the top of the No. 2 coal.

Holes are charged with 4x24-in du Pont powder and each of the two rows is fired separately. Holes are connected with Primacord and detonated with millisecond delays. Drilling and shooting methods still are in the experimental stage and will be varied as needed when more experience is gained with the new shovel.

LOADING AND HAULING

Two Bucyrus-Erie 75-B electric shovels with 5-yd dippers were converted to diesel-electric units to handle the coal-loading job. These units were brought to the new Will Scarlet mine from the Maid Marian plant in Indiana and were equipped with 300-hp Cummins diesel engines and industrial fittings to drive the electrical system of the shovels.

One shovel works on the No. 3 level and one on the No. 2 seam. Haulage is in the lower pit with short ramps to the upper seam for coal truck access. Four 22-ton Euclid end-dump trucks equipped with 300-hp Cummins diesel engines carry the coal about ¾ mi to the portable bin feeding an overland belt system. Truck engines are interchangeable with those on the coal-loading shovels and thus parts inventory is kept to a minimum and maintenance is simplified.

Trucks are equipped with special gates designed by Ray Baughman, general superintendent. These units had been used a short time at the Maid Marian plant and had operated

satisfactorily without gates while hauling a different type of coal. However, when they were put in service at Will Scarlet there was considerable spillage on the roads and they could not carry a full load. The installation of the gates now permits the trucks to carry a full 22-ton load, prevents spillage on roads and speeds coal loading. This device has added 4 to 5 tons to the truck capacity without the inconvenience and controls of a standard-type gate.

The gate is pin-connected to the sides of truck body and remains closed when the body is down. When the body is raised, the gate is moved upward automatically by the change in bed position. A wire rope that passes through a U-shaped piece of pipe welded to the frame pulls the gate upward as the bed is raised. As the bed is lowered, the gate returns to the closed position. When the gates were first installed they "jiggled" but that was remedied by fastening rubber pads at critical points.

Trucks discharge into a 50-ton skid-mounted steel bin equipped with a 36-in apron feeder that delivers coal to the belt system. Construction of the bin and feeder was handled by Robert Holmes & Bros., Danville, Ill.

A 36-in Transall belt conveyor with prelubricated idler bearings carries the coal cross-country to a second similar unit that elevates it to a lowering spiral at the 5,000-ton storage pile. The spiral eliminates the need for an adjustable boom on the end of the stacker belt and lowers the coal to the top of the pile with a minimum of degradation. The stacker unit is 350 ft long and is inclined 16 deg. Both belts are driven through Westinghouse gear reducers powered by 60-hp 440-v 1,800-rpm totally enclosed Allis-Chalmers motors. Conveyor belting is U. S. Giant XN 4-ply 42-oz with ⅛ in top cover and 1/16 in bottom cover. The stacker belt also has a breaker strip.

As stripping progresses, field belts will be added in 2,000-ft sections that also will be driven by 60-hp motors similar to present units. All belt splices will be vulcanized. To permit a fast changeover to a new belt-loading point after a belt extension, a spare steel bin will be set up at the end of the extension and will go into service as soon as new belt is ready for operation. The old bin will be pulled away from the belt with a bulldozer and stored for use when another extension is to be made.

Sequence control of the belt system is handled from the field bin. The stacker unit starts first and when it is up to full speed a centrifugal switch starts the field belt, also provided with a centrifugal switch that controls the bin feeder. A special emergency conveyor control purchased from the Ensign Electric & Mfg. Co. has been installed along the conveyor line to permit stopping or starting the belt from any point along its length and locking it out if desired.

Management selected the overland belt haulage because of the savings that could be achieved with it at the Will Scarlet property. Among these are.

1. Elimination of the cost of building and maintaining long high-speed haulage roads.
2. Movement of larger tonnages with fewer and smaller trucks.
3. Adaptability of the belts to recovery after the property is worked out. Roads cannot be recovered.
4. A smaller maintenance force, since belt repair will be negligible as compared to truck repair.
5. Less garage space and a smaller supply inventory.

POWER DISTRIBUTION

Power is delivered to the property by the Central Illinois Public Service Co. at 33,000 v. A Stonefort transmission line of No. 4 solid copper wire carries the 33,000-v power to a portable bank of three single-phase 500-kva General Electric transformers where it is reduced to 4,000 v for operation of the big shovel.

A 4-wire overhead system leading from the substation to the field switch house is planned for the future as mining advances. A main transmission line consisting of 4/0 solid copper conductors will be installed parallel to the direction of stripping for the length of the pit. Four equally spaced lateral lines will be constructed at 90 deg with the main line and lead to the pit. A General Electric FK 142 switch house will be connected to the lateral nearest the shovel and power will be delivered to a junction box before flowing to the shovel through 2,000 ft of 3-conductor Simplex cable. As the shovel approaches the 2,000 ft limit from the power source, the switch house, junction box and cable will be moved to another lateral line and reconnected.

A group of pit transformers consisting of 25-, 15- and 150-kva units provides 440-v power to the pumps and auxiliary electrical equipment.

All pit transformers, shovel substations and switch house are equipped with General Electric ground-relay protective devices. Pit transformers and switch house relays are set slightly lower than the main substation relay. Thus if the field relays fail to function, the substation unit will provide protection.

Power for the preparation plant is stepped down to 440 v by three General Electric 500-kva transformers. Nine 600,000-cir mil bare copper wires carry power from the main substation to the General Electric switch board in the plant. Plant controls operate on 110 v.

SERVICE BUILDINGS

Maintenance and service departments are housed in three prefabricated steel buildings adjacent to the preparation plant. Units consist of an 80 x 40-ft shop, a 100 x 50-ft garage and a 140 x 40-ft combination warehouse and office. Buildings were supplied by the Mesker Steel Co., Evansville, Ind. All maintenance, including rebuilding, is handled at the mine.

PREPARATION

Flexibility and simplicity were the keynotes when Stonefort engineers designed the Will Scarlet preparation plant. A complete cleaning plant was available at the Maid Marian operation which was nearly depleted, but alteration was necessary to fit the needs of the new mine. Stonefort engineers took the crushing, cleaning, drying and sizing units from the Maid Marian plant, added equipment where necessary and designed a plant that handles the cleaning job very effectively.

A 48-in reciprocating feeder beneath the stockpile hopper delivers coal to a 48-in Link-Belt elevating conveyor that discharges into a 9 x 7-ft Bradford breaker with 4-in openings.

Two Link-Belt wash boxes, each capable of handling 250 tph, are assigned the job of washing the coal. The clean 4 x 0 is separated into 4 x 2, 2 x 1¼, 1¼ x ¾ and ¾ x 0 sizes. Included in the coal circuit are crushing and screening units for reducing 4 x 2 to 1¼ x 0 and sizing it into standard stoker sizes. A secondary crusher is available for reducing 1¼ x ¾ to ¾ x 0 if desired.

The ¾ x 0 is separated into ¾ x 10M and 10M x 0 fractions and the ¾ x 10M is loaded separately or mixed with other sizes. Five Baughman Verti-Vane heat driers are being installed to dry the ¾ x 10M coal and management plans to have them in operation by the fall of 1954. A battery of three Deister Plat-O tables cleans the 10M x 0 before it is dried in a CMI centrifugal drier.

All coal except carbon is loaded into railroad cars by adjustable loading booms and oil-treating facilities are installed on the No. 3 boom.

LOW-ASH COAL leaves completed plant especially designed to serve No. 12 Alma mine where . . .

No. 12 Alma Mine . . . Conditions:

Three types of underground units cope with widely varying conditions and permit comparing methods.

Simplicity in design, with heavy equipment at ground level, feature new washing plant providing quality product from R-O-M with high rock content.

By J. H. EDWARDS
Associate Editor, COAL AGE

ADDITION OF A WASHING PLANT to the tipple at No. 12 Alma mine of the Sycamore Coal Co., Cinderella, Mingo County, W. Va., 3 mi out of Williamson on U. S. 52, marked completion of a development and construction program that began 16 yr ago. At that time, a test opening was made in the Alma seam with operation by hand loading into end-dump cars and run-of-mine shipment via an elevator into railroad cars. Because of difficult seam conditions and impending progress in mining methods and mechanical cleaning equipment, the company management, under Charles A. Hamill, president since 1935, decided to feel its way rather than plunge into its program.

The washing plant turns out a very low ash product and is extremely simple in design. Although fully mechanized, the mine is not standardized as to methods, and the equipment at this time includes both high-capacity and low-height types for full seam and selective mining. As yet the management is not fully committed to any one type.

Sycamore Coal Co., organized in 1910, shipped its first car of coal March 17, 1911, from its Cinderella mine in the Winifrede seam. Fred A. Heitzman, of Cincinnati, now vice president of the Old Ben Coal Corp., but at that time a salesman, sold that particular car. Old Ben is the exclusive sales agent for Sycamore Coal and its affiliates, the Sycamore Coal Corp., with mines at Patterson, Va., and the Cinderella Coal Corp., with mines at Hatfield, Pike County, Ky. At the end of 1953 the Sycamore interests had produced approximately 20,000,000 tons of coal and, at the average rate of production for the past 43 yr, has coal reserves for a life of close to 200 yr.

ALMA INVESTIGATION

In the 1920's the company did considerable core drilling to prospect the Pond Creek seam, which is below water level. These test holes penetrated the Alma seam, which outcrops 2 mi down the creek from Cinderella. Because of the thick parting this Alma coal was assigned no value. Finally, in the 1930's, when additional drilling was done, the Alma cores were analyzed and the results showed such a high quality that mining pos-

FULL-SEAM MINING involves handling parting and draw rock.

Adverse . . . Efficiency: High

sibilities were indicated in spite of the thick parting. This Alma coal is low in ash, low in sulphur, high volatile and suitable for by-product, domestic and steam uses.

Approximately 5,000 acres carrying 50,000,000 tons of the Alma and Pond Creek coals are available to the No. 12 Alma mine. About 4,000 acres are owned in fee and the remainder is leased. In brief, the Alma mining conditions are these: bottom bench of coal, 42 in; slate parting 10 in to 18 ft; top bench of coal, 24 in; draw rock, 10 in; strong main top; hard bottom. Cover ranges up to 1,200 ft.

Upon opening the mine in 1938 and penetrating 1,500 ft, taking only the lower bench, it was found that where the parting was thin (10 in) it could not be held in place, but could be held if 3 ft or more. Consequently, mining was dropped back to the drift portal, the upper bench of coal was recovered and about 10 in of drawslate was taken down, all on a hand-loading basis, gobbing the slate at the face. The parting thickness varied widely. At one place there was a change from 10 in to 50 in in an advance of 50 ft.

PREPARATION FOR SELECTIVE MINING

In 1945, a Joy 8-BU loader and a Jeffrey L-400 track-mounted loader were installed and mining was done selectively, gobbing a considerable portion of the parting and drawslate at the face. The mine also continued to work hand loaders. By this time (1945), a screening and picking tipple had been built, but in January, 1949, the company began to ship the Alma coal 2 mi up the creek for night-shift cleaning at the Cinderella mine, which is equipped with an R&S Hydroseparator and Super-Airflow table. This Cinderella plant proved inadequate to handle coal from full-seam mining with such a large percentage of refuse as the Alma, so the next step was to consider adding a washing plant to the No. 12 Alma mine tipple.

HIGH REJECT, LOW ASH

It was decided that this washer must be able to handle coal containing as much as 50% rejects to accommodate full-seam mining without separating any of the refuse at the face. Another objective was reducing the ash in the ¼ x 0 fraction to an average of under 5½%. This new washing plant, completed in September, 1953, is of extremely simple design and turns out coals of very low ash.

A Jeffrey 5-cell 2-compartment Baum jig to wash 7 x 0, with a rating of 180 tons of slate per hour, was selected. A contract was let to the Jeffrey Mfg. Co. to furnish all machinery and install it. The coal company built the foundations and all of the structure. The general layout was largely the work of D. V. Ward, chief engineer for the coal company.

In addition to the jig and centrifugal air compressor, Jeffrey furnished and installed the following:

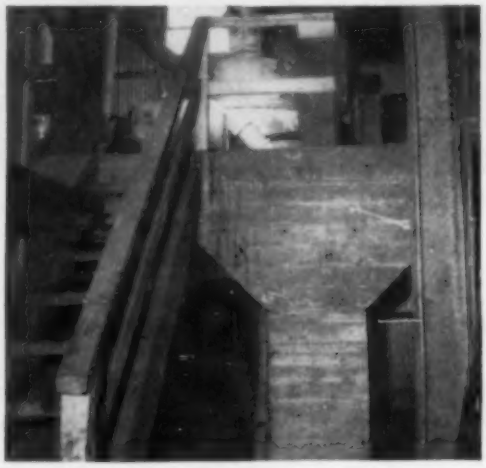
Raw-coal scalping screen and picking table, Parrish-type, with a 7-in-hole stepped screen; placed in existing tipple.

Single-roll crusher to reduce to 6 in the coal picked off the table (only 3 to 15 tons per shift); placed in the existing tipple adjacent to the table.

Belt conveyor moving the raw coal from the scalping screen and crusher to the washery and discharging directly into the jig.

Refuse belt from jig-refuse elevators, discharging to the refuse bin.

PLANT REJECT has averaged 42.5%. Slate in cars at left entering rotary dump is substantially less than that from other sections. Man (right) picks 3 to 15 tons of coal from slate over screen. Belt carries jig rejects to refuse bin.



DEWATERING AND SIZING SCREEN (background, left photo) is mounted on concrete sides of sludge tank. Only scraper conveyor in plant is at left. Centrifugal drier (right photo) is on four concrete columns to confine vibration.

Clean-coal dewatering and sizing screen, Jeffrey standard unit design, with four screen plates, 21 ft total length, top section 7 ft wide and bottom section 6 ft.

Drag chain conveyor and drive for the sludge tank (concrete, built by coal company).

Screw conveyor from the sludge-tank discharge to a scraper conveyor (also furnished by Jeffrey) elevating to a centrifugal drier.

Centrifugal drier, CMI, size E36M, rated at 50 tph.

Circulating pump, 2,500-gpm (Allis-Chalmers).

In addition Jeffrey also furnished all electric motors (General Electric, 440-v) and the control equipment. The coal company furnished the wire and wiring labor.

Three Barber-Greene belt conveyors, two 24-in and one 18-in, carrying the washed products back to the tipple were purchased directly by the coal company and installed by its construction men. One 24-in unit carries the 2-in nut-and-slack, and the second the 3 x 2 stove, while the 18-in unit carries the 6 x 3 egg. The sludge elevator moving the fines to the drier is the only scraper unit in the plant. Consequently, it is expected that maintenance will be quite low.

Ground level of the washer is 12 ft higher than the tipple tracks, a factor which materially reduced construction cost by utilizing ground support for heavy equipment, including the jig. The sludge tank is on the ground and its concrete walls are utilized as the foundations for the dewatering and sizing screen. The centrifugal drier is on a low balcony but is supported on four concrete columns coming up from the ground and capped with a reinforced concrete platform. There is practically no vibration in the washer structure which, like the tipple, has wood framing.

SAMPLING AND LOADING

A large percentage of the railroad cars of 2-in nut-slack, 1¼-in nut-slack and ¼ x 0 carbon are sampled by hand. The samples are crushed, dried and prepared at the tipple, and then are burned in the company's laboratory at Cinderella to determine ash. Officials of the company are highly pleased with performance of the Jeffrey jig. The cars sampled during the first 3 mo of this year showed ash percentages as follows:

	2 x 0	1¼ x 0	¼ x 0
Jan.	4.39	4.73	5.15
Feb.	4.54	4.36	4.24
March	4.64	4.45	4.55

Total moisture of the ¼ x 0 as it leaves the centrifugal drier is 8¼%.

The tipple has three loading tracks. Sizes loaded on No. 1 are 2-in nut-

AIR-OPERATED JIG washes entire mine product from Alma No. 12 after picking and crushing to 7 in.

THREE STANDARDIZED belt conveyors, two 24-in and one 18-in, return the washed products to the 3-track tipple.

PUMP WORKING against 150-ft head moves drier effluent to sludge pond 1,300 ft from washing plant.

TWO TRUCKS keep busy disposing of the large quantity of mine rock and plant refuse in an adjacent hollow.

slack, 1¼-in nut-slack and ¼ x 0 carbon. The loading boom over No. 2 track, which normally handles 6 x 3 and 6 x 2 egg, can be raised to deliver to a crusher. The crusher product is loaded through a chute to the same track. Sizes loaded on No. 3 track (outside, next to the highway) are: 3 x 2 stove, 3 x 1¼ nut, 3 x ¼ and 3 x 0. This track is equipped with a Brownie layer-loading hoist.

AVERAGE REJECT 42.4%

Only that part of the minus-28-mesh coal that goes out in the effluent from the centrifugal drier is wasted. From the time of starting the washing plant in September, 1953, through February of this year the average reject from the preparation plant has been 42.4%. How much is from the scalping screen and how much is taken out by the washer is not definitely known because both forms are mixed in the same bin.

Effluent from the drier is pumped by a Nagle centrifugal unit, 160 gpm at 160-ft total head, Westinghouse 25-hp 1,750-rpm Type CS motor, to a sludge pond at the upper end of a refuse area. The pond is 1,300 ft from the plant and about 100 ft higher. Total head on the pump is now 150 ft. Ash in the effluent solids runs approximately 28%. The pump also handles some ¼ x 0 material cleaned from the sludge tank at the end of the shift.

Mine rock and refuse, which are collected in separate bins, are hauled to the refuse bank by two Dodge end-dump trucks, 24,000-lb gross rating. During a shift turning out 800 tons of cleaned coal the trucks will haul as many as 65 loads of refuse averaging 11 tons each.

MINE PROVIDES WATER

Water for the plant comes from a slope, the portal of which is adjacent to the washer. This slope, 400 ft long, together with an air shaft 140 ft deep and 500 ft from the portal, were completed into the Pond Creek seam in 1950. This seam lies 110 ft below the Alma. After making the underground connection and driving the main entries 500 ft, the work was stopped and the mine allowed to fill with water. A hoist car on the slope track, at present positioned 250 ft down from the portal, carries a Warren single-stage pump, 160 gpm, 335-ft head, Westinghouse 25-hp motor. It pumps the mine water to a 54,000-gal tank on the hillside.

Of the 200 gpm of fresh water added to the plant circuit through sprays on the dewatering and sizing screen, approximately 160 gpm comes direct from the slope pump and the remainder from reserve in the high tank. Mine water is practically neutral.

ONE OF TWO 6-ton shuttle cars serving big loading unit averaging 80 mine cars or 400 tons of material.

MIDDLE-SIZED loading unit with a 9-man crew loads directly to mine cars—49 average per shift.

Mining Units Varied to Meet Conditions at Alma No. 12

LOW-HEIGHT UNIT taking 42 in of coal and 10 in of draw rock normally produces 42 cars per shift.

RUGGED CARS proved in service are built with structural shapes, with bodies boxed with 18-in channels.

SYCAMORE MANAGEMENT includes C. A. Hamill, president (right), and son, Thomas C., asst. general manager.

FULL-SEAM FACE, with L. W. Walters (left), general superintendent, and W. H. Smith, section foreman.

MECHANIZED PRODUCTION by both full-seam and selective methods are provided for in No. 12 Alma development. Mine has 50,000,000 tons available.

Solid-body cars carrying close to 5 tons average are weighed on a Fairbanks-Morse scale with Printomatic attachment, and then dumped entrain in a Kanawha single-car rotary dump. Trips are handled with a Kanawha feeder positioned between the scale and dump.

From the 20-ton dump hopper a Kanawha apron feeder delivers to the R-O-M conveyor discharging to the scalping and picking shaker in the tipple. This conveyor (18 deg, 530-ft centers) consists of a Goodrich 42-in belt on Link-Belt rollers. The feeder and conveying equipment handle slate up to 23 in. Pieces larger than that are broken up at the face or on the car by the dumper. Maximum capacity of the R-O-M equipment is 250 tph at present but can be increased by speeding up the feeder and R-O-M belt.

SHAPES INSTEAD OF PLATES

Of the 160 mine cars used in the mine, the latest 50 are pointed to with pride by mine officials. Built by Enterprise, they were designed to general specifications drawn up by Mr. Hamill and calling for structural shapes for the body instead of riveted plates, a design which Mr. Hamill began suggesting to the mine-car manufacturers some 20 yr ago. The sides of these 50 Enterprise cars are made from 18-in channels. Several years of service has proved the cars far more rugged than conventional riveted-plate units.

Main haulage is handled by two locomotives, one a 10-ton Westinghouse Type 907 unit and the other a tandem built at the mine from 8-ton General Electric Type 703 units. Two car-spotting hoists are in use in the mine, one a Joy and the other a Brownie.

MACHINE LOADING

Loading equipment, all Joy, consists of one 11-BU loading into shuttle cars, two 8-BU's loading into mine cars, and one 20-BU loading into shuttle cars. Cutting is done with shortwalls transported on Joy T-2 trucks. Two Jeffrey 35BB machines, one Jeffrey 35 L and one Sullivan CE-7 make up the equipment. Cutting chains are "Cincinnati," using Duplex bits.

The 11-BU loader is double-shifted and the other loaders operate single shift. Including the preparation-plant crew, 78 men load 1,500 tons of material which nets 800 tons of cleaned coal. The preparation-plant crew is made up of a dumper, coal picker, washer operator, tipple operator, car dropper, two truck drivers, and a preparation engineer and foreman, who spends part of his time at Cinderella mine.

DRILLING AND BOLTING

Drilling is done with Chicago Pneumatic Type 572 hand-held electric drills using Kennametal bits. American Cyanamid permissible explosives are used, No. "3A" for coal and "A" for rock.

Five holes are drilled in mining only the lower bench. These holes are started near the center and angled up toward the top. In full-seam mining the slate parting usually has to be shot if it is over 15 in thick. Where the parting runs up to 30 to 40 in, as many as 15 holes must be drilled and shot to bring down the two benches of coal and parting for handling.

Roof-bolting of the 7-heading mains was done with an Acme rubber-tired unit consisting of an air compressor and mounted stoper. This unit was very efficient when the mains were being extended through an area where the parting had thickened to as much as 14 ft. After a cut was loaded from the bottom beanch, the Acme unit drilled for shooting down 3 ft of top rock. After this was loaded out, it returned to the place and drilled and installed the roof bolts. No roof-bolting is being done at present because conditions do not require it.

49 TO 80 CARS PER SHIFT

In the 20-BU section, mining a 42-in bench of bottom coal and loading 10 in of draw rock with it, using a 10-man crew including the section foreman, the normal production average is 62 mine cars per shift. Two Joy 8-SC shuttle cars, carrying about 2½ tons each, service the loader.

An 8-BU section with a 9-man crew, including foreman, and mining both benches, the parting and several inches of draw rock, normally averages 49 cars per shift, loading directly into mine cars.

The big equipment, consisting of the 11-BU serviced by two Joy 10-SC 6-ton shuttle cars, and likewise mining both benches, the parting and some draw rock, normally averages 80 cars. Experience to date in the mine indicates that the big unit is by far the most economical for the full-seam mining and it is likely that more of that big equipment will be installed.

Substations supplying DC are on the outside. One, near the haulage portal, consists of a Westinghouse 500-kw synchronous converter supplied through a Westinghouse dry-type 550-kva transformer and three Westinghouse auto-transformers to boost AC input to 218 v, resulting in 300-v output. Another substation at a drift 1½ mi from the haulage portal consists of a 200-kw Ridgway converter powered through General Electric oil-cooled transformers.

Mine ventilation is supplied by a Guyan Machinery fan driven by a Westinghouse 25-hp Type CS 440-v motor.

Thomas C. Hamill, son of Charles A. and residing at Cinderella, is assistant general manager of Sycamore Coal and affiliates, and D. V. Ward is chief engineer. L. M. Waters is general superintendent of Sycamore No. 1 and No. 12 Alma mines. A. L. Rowe is preparation engineer. Avis Randolph is general mine foreman of No. 12 Alma, and Orville Webb is chief electrician.

CHANGE HOUSE—Good architecture results in clean lines, attractive appearance and a functional design, with offices at right and entrance to shaft at left. Additional major goals were low first cost and low maintenance.

WATER SUPPLY—Dam for impounding, with treatment plant in the background.

Architecture in Coal Mining

Low installation cost, low maintenance cost and eye-pleasing appearance reflect close harmony by designers and architects.

THE ARCHITECT is changing both the pattern of the past and the appearance of coal-mining plants—in both instances, for the better. In the past, in contrast, flow lines were established, proper equipment was selected, and a suitably cheap and convenient enclosure was put around the assembly. Architecture was rather generally held to result in unnecessary ornamentation. Today, there is ample evidence that the engineer and architect, working in close harmony, provide plants that promote production efficiency, please the eye, and—quite often—cost less than their predecessors.

"Stimulus to Imagination"

As a case in point, consider a new plant recently brought into production in southwestern Pennsylvania. Located among gently rolling hills and alongside a creek winding through a fertile valley, the natural beauty of the site was a stimulus to the imagination.

In traditional manner, the owners started with the development of the slope, shafts and cleaning plant, and located the necessary auxiliary facilities. With standard plans available for most of the 19 auxiliary buildings, an unprecedented decision was made. Traditional construction would be evaluated in the light of modern planning techniques. This decision was all the more significant in that the site was not adjacent to any heavily travelled highways, nor was it near any highly populated community, where valuable publicity would be an added incentive.

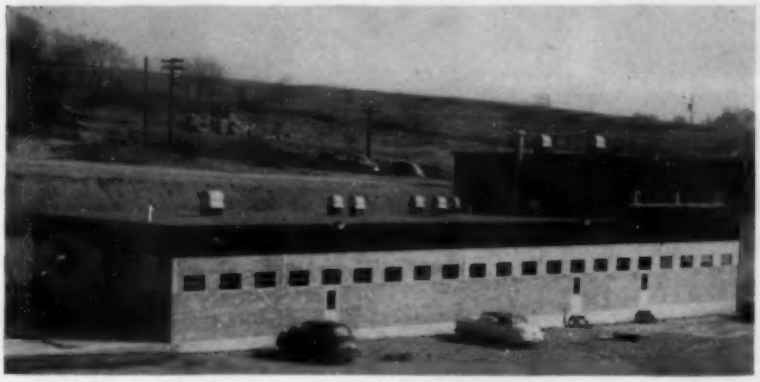
"The Budget Was Stringent"

Preliminary plans were initiated after restudying the individual building functions in terms of operating and personnel requirements. The budget was stringent. Materials were carefully selected in terms of first cost, ease of maintenance and conformity to design unity. The owners bought the preliminary proposal, which achieved plant efficiency, comfortable and cheerful interiors and simple, interesting exteriors. Final plans were started immediately.

The activity center aboveground is the change house. There was little flexibility in location, since the shaft was already down and one end of the change house had to be next to it. A reservoir and the railroad restricted the building on the south and east, and state roads bounded the other sides, leaving a triangular-shaped val-

CHANGE-HOUSE CONSTRUCTION—Precast interior columns, with sliding forms for roof, cut cost.

SHOWER ROOM—Ease of maintenance was a requirement in designing facilities and selecting equipment.



MACHINE SHOP—Harmony in tile, glass brick and corrugated protected-metal siding.

ley and hillside. After redevelopment, it provided space for the change house and room for parking 400 cars.

"Convenient Access"

Management-men relationships and ease in the ebb and flow of personnel indicated a rather exact relationship in elements, as follows:

Assembly room, office space and individual quarters for operating management, directly off the main lobby.

Lamp room, rescue room, first aid, engineers' office and firebosses' quarters, adjacent to the shaft.

Locker room, providing for approximately 1,000 men on three shifts, convenient access to the shaft.

The change house proper, 67x191 ft, was built of structural concrete, using sliding forms. The concrete was left exposed, since this wing required no high degree of finish and was subject to high humidity from the showers. The administrative wing, 34x100 ft, plus a triangular lobby, is framed in steel and provided with a suspended ceiling. The exterior walls combine aluminum sash, glass block and salt-glazed wire-cut tile. Clear-glazed ceramic tile is used for the interior walls.

"Fully Automatic Facilities"

The heating plant utilizes fully-automatic gas-fired package-type boilers. Temperature control is completely automatic. A floor-type radiant-heating system provides surface temperatures of 80 to 85 F in the locker room. To facilitate airing and drying miners' clothes, the change house is completely ventilated both summer and winter. Two-speed exhaust fans permit increased air flow in summer. Hot water for showers is thermostatically controlled at 105 F, and is available up to 8,000 gph.

Water-treatment and sewage-treatment plants also are fully automatic. The treated water meets Pennsylvania Board of Health standards for Class A drinking water. The sewage-treatment plant is designed to handle three daily peaks, and otherwise is relatively inactive. Consequently, the primary equipment is considerably oversized, while the secondary sand-filtration facilities handle approximately 30,000 gpd.

"156,000 Gal Maximum"

Since the coal is wet-cleaned, the daily water consumption is considerable. The domestic requirement is approximately 50,000 gpd, with plant water totalling 67,000 gpd of 16 hr. Peak coal production, however, can run the total up to 96,000 gpd. If a fire should occur, the 1,000-gpm pumpers would require 60,000 gph. Since domestic water is classified as plant make-up water, the daily consumption can reach 156,000 gal in an emergency.

Cast-iron pipe with mechanical joints was specified by the company for both the sewage and water-distribution systems. Welded steel pipe is substituted for sections beneath the railroad tracks.

Many of the buildings were located in fill areas. Although carefully filled, it was recognized that settlement could take place. However, no subsidence of floors and foundations has been detected in the year following installation.

"Precasting Cut Cost"

Although none of the individual buildings are large, it was found economical to employ precasting techniques for grade beams, columns, tank walls and roofs. Reduction in total form work and bracing, together with greater ease in placing concrete, lowered the cost of the precast units 15%, compared to poured-in-place units.

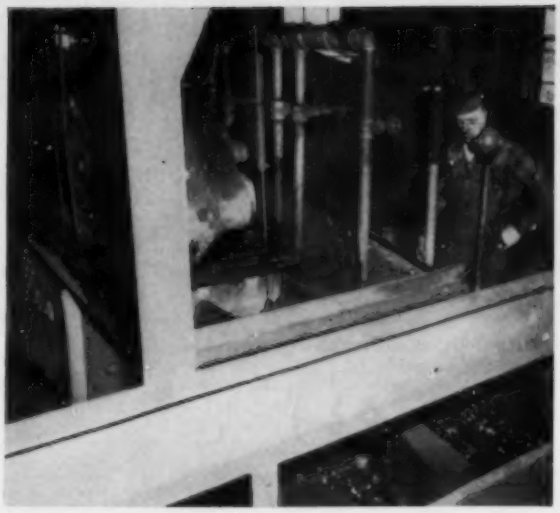
The project was completed within the time allotted and every unit is now in operation. The company is convinced that careful planning has produced a plant both management and men can be proud of. No additional expenditure was necessary, and the installation will be less costly to maintain over the years, compared to traditional installations.

Design, Roberts & Schaefer Co.

Construction, Roberts & Schaefer Construction Div.

Associated Architects, Lorimer & Rose, New York.

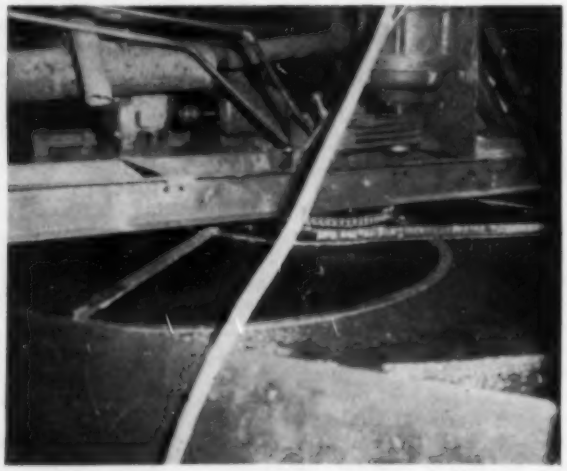
Associated mechanical engineers, Karsunky, Weller & Gooch.



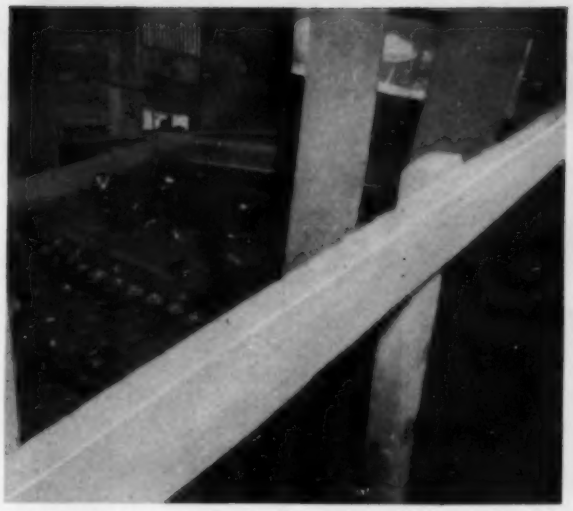
CLEANING THE COAL—A heavy-media drum-type cleaning vessel cleans 3¼ x⅝-in coal at 1.68 sp gr at a feed rate of about 100 tph. Clean coal is dewatered and magnetite reclaimed on the 5x16-ft vibrating screen shown at right.

FOUR MEN work inside the Swatara plant in achieving daily output of 650 tons.

Coal from several sources is carefully blended by Swatara Coal Co. to level the plant load both in size-consist and impurities. Cleaning processes include heavy media, tabling, classification and flotation.



CLEANING FINE COAL—No. 4 clean coal flows out of cleaning unit (left) onto 18-M 6x12-ft riffle for dewatering. Feed for flotation machine (right), which cleans No. 5 coal, is preconditioned on a 45-M riffle to remove high-ash fines.



RECLAIMING FLATS—Top four decks of sizing shakers are equipped with flat-picking sections. Egg and stove flats pass through one set of rolls and nut and pea flats through another, and products of both rolls are returned to shakers.

Cleaning Anthracite Completely

RECEIVING RAW COAL from several deep and strip mines in the southern anthracite field and converting this into standard anthracite is the job now being done by Swatara Coal Co., Minersville, Pa., using a Wemco Mobil-Mill for cleaning the 3¼x⅝ egg-through-buckwheat fraction, a Deister SuperDuty Diagonal-Deck table for ⅝x⅜ rice coal, a 5-ft Menzies cone for ⅜x³⁄₃₂ barley, another table and a 6-ft Wilmot hydrotator for No. 4 coal and a 9-ft Wilmot froth-flotation classifier for No. 5.

The Mobil-Mill was added in early 1953 and was placed in operation in June, 1953. The original plant, situated along Swatara Creek at Zerbe, Pa., began operations in 1947.

The company is headed by W. Pryce Parker, president, and John W. Butcavage, general manager of operations. Mr. Butcavage also is secretary and treasurer. Total employment, including officials, is 21 men, and production is from 600 to 650 tpd with the plant working a single shift. Company officials now are developing a deep mine of their own.

PREPARING FEED FOR THE CLEANING UNITS

In handling the problem of providing uniform feed for the plant from the raw coal arriving from several sources, Mr. Butcavage included in his designs a provision for three 150-ton feed hoppers, each receiving coal from trucks which haul from a particular source. The three hoppers feed into the main feed conveyor, thus blending the different raw coals into a uniform feed for the plant. The raw coal is moved out of each hopper into the chain-and-flight main elevating conveyor by an electrically-driven push-type feeder having a truck transmission between the drive motor and the speed reducer. This provides another control over blending since the three hoppers may contribute to total feed at different rates, depending upon the selection of gear ratios in the transmissions. Normally the transmissions are operated in first gear.

The use of three separate hoppers also permits faster dumping by the truck drivers. This is an advantage for the independent producers in the fact that their trucks make the fastest-possible round trips, thus either raising their productive potential or eliminating some haulage capacity that otherwise would be needed.

The main feed conveyor lifts the raw coal at a rate of about 150 tph to the top of the preparation circuits where it discharges onto a scalping screen which makes a separation at 3¼ in. the top size for egg coal. The plus 3¼-in is hand picked, then passed through a set of rolls to be reduced to egg and smaller.

The product of the rolls rejoins the minus 3¼-in material which passes through the scalping screen and the combined stream is fed onto the wet primary sizing shakers. This is a 6-deck installation with cams 120 deg apart.

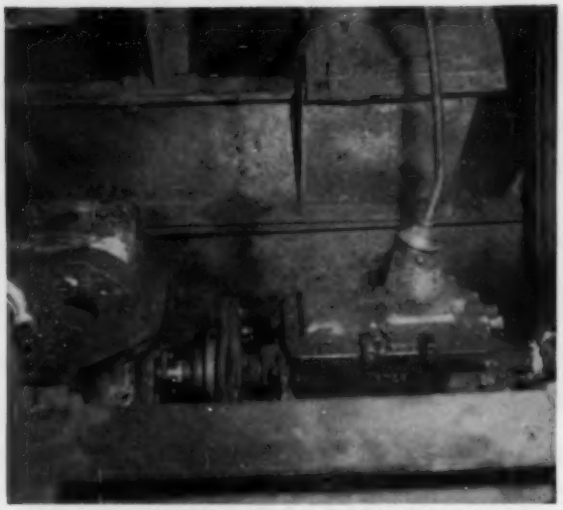
The overproducts of the top three decks (3¼x⅝) make up the feed for the heavy-media drum in the Mobil-Mill. Overproduct of the next lower deck (⅝x⅜) is feed for the rice-coal table. Changes are being made to include this material in the Mobil-Mill feed.

The ⅜x³⁄₃₂ barley fraction from the next lower deck is chuted into the Menzies cone for final cleaning, and the ³⁄₃₂x³⁄₆₄ from the lowest deck is fed onto the second table to produce No. 4 coal.

The underflow of the primary sizing shakers, water and minus ³⁄₆₄-in fines, is dropped into a 9-ft-diameter 10-ft-high cylindrical settling tank. The over-flow of this tank is collected in a peripheral launder and pumped back to the feed end of the primary-sizing shakers to assist in breaking up the raw feed for more efficient sizing. The settled fines are drawn from the settling tank and sluiced to a separate plant which houses the hydrotator and the oil-flotation machine.

ACHIEVING STANDARD QUALITY IN THE CLEAN COAL

The "Standard Anthracite" specifications lay down rigid limits both on allowable impurities and on the amounts of oversize and undersize in the various commercial sizes. Effective cleaning and screening are necessary to produce coal within these



FEEDING THE PLANT—Three 150-ton hoppers receive raw coal from different sources to permit better blending. Truck transmissions (right) control speed of feeders which supply raw coal elevating conveyor.

LOADING THE COAL—Trucks are loaded directly from clean-coal pockets. Any size may be diverted on belt conveyors to railroad loading boom. The coal is rescreened over lip chutes and screenings are pumped to raw-coal shakers.

limits, and the Swatara circuits are designed and operated to produce such coal.

The Mobil-Mill is equipped with a dual-gravity drum, although both compartments are presently being operated at 1.66-1.68 sp gr, since the feed now entering the plant can be separated at this gravity into a clean refuse and a coal product in which substandard impurities are contained in flats that may be screened out, crushed and recirculated. Therefore, the products of both the clean-coal and middlings sections of the 5x16-ft Allis-Chalmers Low-Head media screen are discharged onto the final-sizing shakers. The refuse is chuted directly into a steel refuse hopper for truck haulage to refuse bank.

The discharge end of each of the top four decks of the clean-coal sizing shaker is equipped with flat-picking screen sections. Flats from the egg and stove decks are crushed to nut and smaller (minus 1⅝ in) in a Scottdale double-roll crusher. Flats from the nut and pea decks are crushed to buckwheat and smaller (minus 9/16 in) in a double-roll crusher having washboard-type corrugations on the faces of the rolls. This crusher is a product of the Quirin Machine Co., St. Clair, Pa. The roll faces may be rebuilt periodically by raising the worn corrugations with hard-surfacing materials.

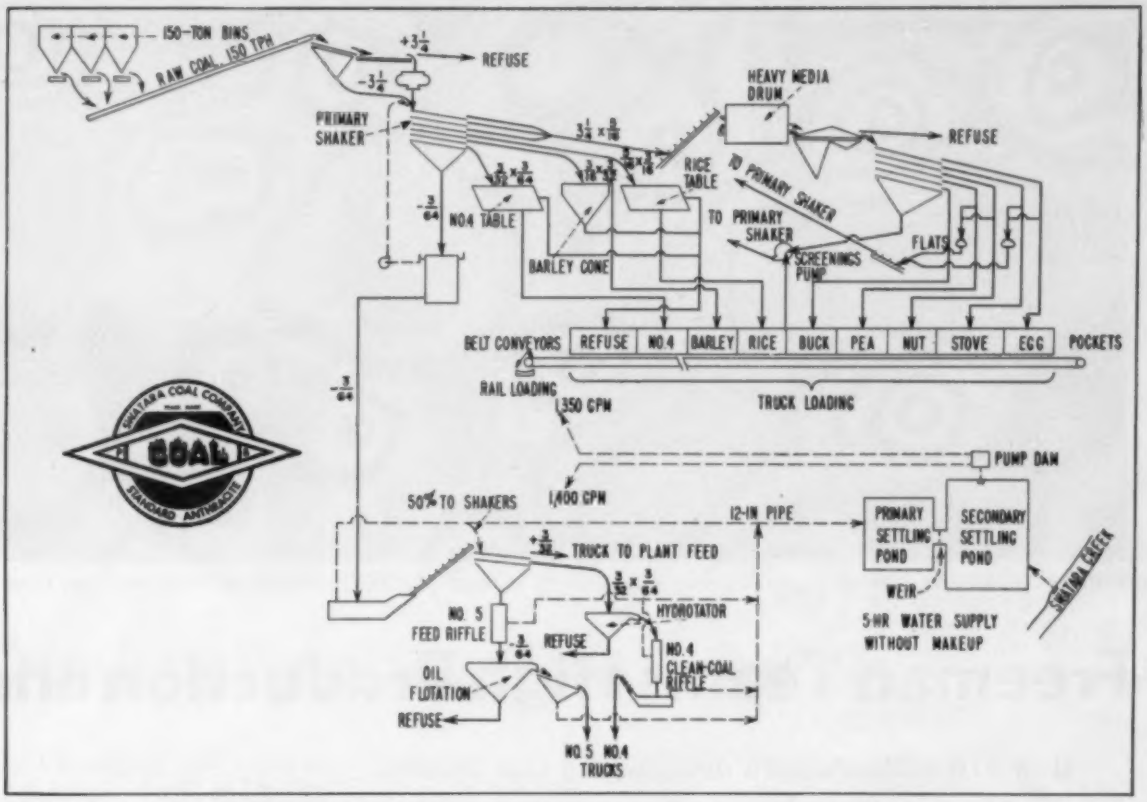
The products of both rolls are recirculated through the heavy-media vessel, and the clean coal which passes over the flat-pickers is chuted directly into storage pockets. The prepared sizes, egg, stove and nut, comprise about 42% of the total plant product at the clean-coal pockets.

Clean coal from the Menzies cone and the two tables, the other units in the main plant, are chuted directly into the rice, barley and No. 4 pockets.

RESCREENING CLEAN COAL BEFORE LOADING

The pockets are arranged for direct loading into trucks or for indirect loading into railroad cars via a conveyor belt. In either case, the coal as it leaves the pocket passes over a lip screen under fresh-water sprays to eliminate degradation sizes. Barley and No. 4 coal are the only sizes not rescreened in this manner.

The degradation coal from underneath these lip screens is collected with the underflow of the clean-coal



SWATARA CLEANING CIRCUITS—Planned layout saves water, eliminates excessive rehandling, requires minimum labor.

sizing shakers and pumped back to the feed end of the primary-sizing shakers for recirculation through the plant. This stream also assists in breaking up the raw feed on the primary shakers.

Trucks are loaded directly from the pockets over straight chutes long enough to reach down into the truck beds. The railroad loading point, however, is 150 ft away from the plant. The connecting link consists of two 24-in Barber-Greene belt conveyors, one 200-ft-long unit installed under the chutes at the clean-coal pockets and the other at right angles to the first one to receive coal from the first belt and discharge it into the railroad cars.

The egg, stove, nut and pea sizes are screened again at the discharge end of the loading belt, and all sizes are sprayed with fresh water. The fines recovered from this final screening are collected in a truck and returned to the plant feed hoppers, although the company now plans to provide another screenings pump here to return the fines eventually to the primary-sizing shakers.

When the changes have been completed for cleaning rice coal in the heavy-media drum, the rice table will be installed in the fine-coal plant to treat refuse from the fine-coal cleaning units. This will increase the yield in the Nos. 4 and 5 sizes and will permit concentration and direct loading of the refuse rather than running it off into the primary settling dam.

CLEANING NOS. 4 AND 5 COAL IN SEPARATE PLANT

Feed for the fine-coal plant consists of solids from the cylindrical settling tank which receives the underflow of the primary shakers. The raw fines are sluiced 650 ft from the main plant into a settling tank at the fine-coal plant. The settling-tank conveyor discharges to a double-deck shaking screen where the feed is split into a plus-$\frac{3}{32}$-in fraction which is returned by truck to the feed hoppers at the main plant, a $\frac{3}{32}$x$\frac{3}{64}$ fraction which feeds the 6-ft hydrotator and the minus $\frac{3}{64}$ underflow which feeds the 9-ft oil-flotation machine.

Swatara Coal Co. makes effective use of two riffles in the fine-coal plant. One of these is used as a dewatering device under the No. 4 clean coal; the other is installed ahead of the flotation machine to precondition the No. 5 feed before it enters the cleaning unit.

Both are installed on a 1-in-12 slope. The 6x12-ft dewatering riffle for the No. 4 coal is dressed with 18-M stainless-steel cloth (0.017-in wire and 0.0386 openings). The 6x10-ft riffle ahead of the No. 5 cleaning unit is dressed with 45-M stainless-steel cloth (0.010 wire and 0.0122 openings). The size of the openings and the slope of the screen surface on the latter are such that a major portion of the minus 100-M fines drops out of the No. 5 feed.

The No. 4 clean coal passes over the riffle then into a settling tank, and is loaded directly into trucks by the bottom conveyor of the settling tank. The No. 4 coal produced by tabling in the main plant is loaded only into railroad cars.

Major advantage of the riffles, Mr. Butcavage says, is that repair and maintenance costs are low since there are no parts except the screen cloth to be replaced.

Fresh water is taken from Swatara Creek, although only about 250 gpm is required as makeup water for the 2,250-gpm plant. About half the water required in cleaning is recirculated directly and the other half is pumped from the secondary settling dam.

SURFACE PLANT at Freeman's 800-tph Crown mine includes office building (left), truck garage, hoist room and boiler

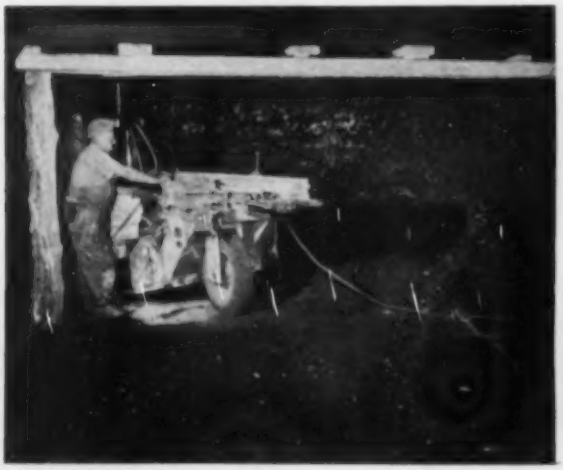
Freeman Teams High Production and

How $10 million Crown development taps 26,000 acres of Illinois No. 6 coal, producing a super-prepared coal in a modern 800-tph cleaning plant.

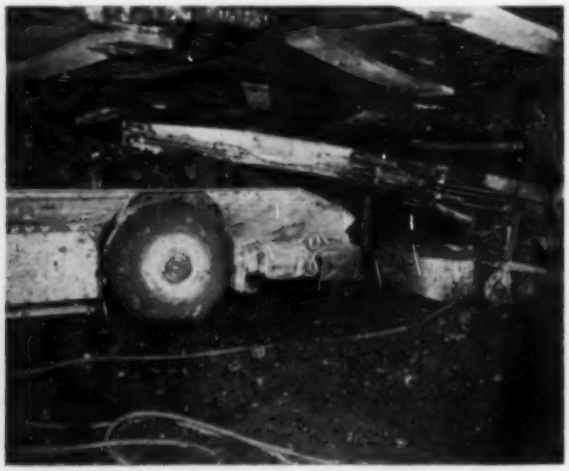
TOP-NOTCH PREPARATION and efficient deep mining with modern equipment are the keynotes at the Crown mine of the Freeman Coal Mining Corp. Capable of producing and cleaning 2,000,000 tons of Illinois No. 6 coal per year, Crown mine was designed to supply to the Middle West a super-prepared Central Illinois coal for industrial and domestic markets.

Crown mine, a $10 million development, is located at Farmersville, Montgomery County, Ill., about 25 mi south of Springfield, on U. S. Highway 66, and is served by the Chicago-St. Louis branch of the Illinois Central R.R. The 26,000-acre tract of coal was acquired by Freeman after the end of World War II when it was advertised for sale by the Alien Property Custodian after efforts since the first World War had failed to locate the owner.

Heading up the Freeman management team is Col. Henry Crown, chairman of the board. Other members of the executive group are: Stuart Colnon, president; Frank Nugent,



ROOF SUPPORT consists of roof bolts, when bolts can be anchored, and steel crossbars.



HIGH-CAPACITY loaders and shuttle cars work under well-supported roof to produce up to 500 tons per shift.

room, bathhouse, shop and warehouse, machine shop, and supply house.

Quality Preparation

executive vice president; Irving Crown, vice president and secretary; and Malcolm J. Proper, treasurer. Directly in charge of operations at Crown mine is John Abrell, general superintendent.

The Crown preparation plant was designed and built by the Roberts & Schaefer Co. The Paul Weir Co. and Mines Engineering Co. were consultants in design and development.

MINING CONDITIONS

Mining is in the Illinois No. 6 seam which lies about 350 ft below the surface and averages about 7 ft in thickness. The seam is free of impurities except for thin bands of soft rock, the thickest about 12 in. above the bottom. Overlying the coal is a very tender black-shale roof that contains many slips and disintegrates rapidly when in contact with water. Sometimes limestone is present above the shale.

When the roof is strong enough to provide good bolt anchorage, roof bolts are used for support. Otherwise the roof is supported by steel-rail or wood crossbars set on close centers.

The mine is dry and water must be piped from the surface for dust-suppression purposes. Grades are gentle and no major grading has been necessary to provide a uniform haulage grade.

Access to the mine is by two vertical shafts 600 ft apart. The main shaft is a 3-compartment unit with two skip compartments for hoisting coal and an escapeway equipped with a spiral staircase. The second shaft serves as an air shaft, manshaft and supply shaft.

From the shaft bottoms a 7-heading main-entry system was developed east and west. Headings were driven 14 ft wide on 60-ft centers. Leading from the main east-west entry at an angle of 90 deg from a point between the two shafts are the north and south main entries. Like the east-west entries, these were developed in a 7-heading system on 60-ft centers.

Cross entries off the north and south mains were developed on 4,360-ft centers with 7-headings on 60-ft centers.

Room panels on 720-ft centers were developed in a 3-heading system at right angles to cross entries. Panel headings originally were driven 14 ft wide on 60-ft centers, but now are developed on 50-ft centers. Two bleeder headings are maintained between room panels and main entries. As the panel headings are advanced, rooms are necked to a depth of 60-ft.

Rooms, 24-ft wide on 50-ft centers, are driven 310 ft deep in groups of six off both sides of the panels. One side of the panel is mined advancing and the other retreating. Pillars are not extracted because of the need to sup-

BELT CONVEYORS in 2,000-ft panels, handle section haulage between shuttle cars and mine cars in cross entries.

MINE CARS are loaded parallel to track by a quickly reversible chute mounted in front of belt-head pulley.

COAL DRILLING is handled by two-man crew using self-propelled rubber-mounted twin-boom hydraulic unit.

COAL BREAKING is done on shift with compressed air at 10,000 psi piped to face from surface compressors.

FULLY AUTOMATIC high-speed balanced hoist raises 800 tph up a 491-ft shaft. Unit is controlled from foot of shaft.

HOIST CONTROLS are housed in cabinet units adjacent to hoist. Positive safety devices are included in controls.

port the farm lands on the surface. A solid block of coal 76 ft thick is left between each group of rooms to provide additional roof support.

MINING METHODS

Mining is on a two-shift basis at Crown, with eight off-track mobile units producing on the first shift and seven on the second. There is available a ninth complete unit that serves as a spare.

Each loading unit consists of a Joy 11-BU loading machine, two 10-SC shuttle cars, 10-RU cutter, CD-26 twin-boom coal drill and Fletcher hydraulic rotary roof-bolting unit.

A normal section crew is made up of the following men: loading-machine operator and helper; cutting-machine operator and helper; two shuttle-car operators; one shotfirer; two drillers; four roof-support men or two roof-bolters; one ventilation man; one utility man; and one mechanic.

Mine management maintains a nice balance between entry development and room work, and production units are concentrated so that four of them usually are producing on one cross entry. This method simplifies haulage, supervision, ventilation and maintenance.

Cutting machines have 9-ft bars equipped with Prox chains and hard-surfaced throwaway bits. Coal is cut horizontally about 14 in above the bottom and nine holes are drilled per cut in entries and 14 holes in room work. Coal breaking is done on-shift with compressed air. Compressor stations, located on the surface, supply compressed air to the faces at 10,000 psi.

Two 7-ton shuttle cars receive coal from a loader and transport it a maximum distance of about 400 ft to a 36-in. Barber-Greene belt conveyor traveling 350 fpm. The belt discharges into 8-ton solid-bottom steel mine cars in the cross entry. A 2-way chute at the discharge end of the belt permits constant loading of mine cars without spillage. After a car is loaded, coal discharging from the belt may be diverted to the next empty car almost instantly. Cars are spotted at the belt-discharge point by a Nolan Porta-Feeder, and loaded cars are handled between the loading point and coal-hoisting shaft in 8- to 14-car trips.

ROOF SUPPORT

A tender, friable roof full of slips and subject to rapid disintegration presented a challenge to Crown production men. Here's how they met the challenge and the results they are getting.

Wherever possible, roof-bolting has been practiced at Crown mine. Bolting crews follow the loading machine and work under a steel safety crossbar while installing 3- to 6-ft-long Bethlehem expansion-shell bolts. Bearing plates are 6x3x$\frac{3}{8}$-in. Bolt length is varied according to the distance to the

ROTARY DUMP at foot of hoisting shaft dumps cars entrain. Coal is hoisted to preparation plant in 8-ton skips.

material offering the best anchorage. Various sizes of wood headers also have been used with the bolts to support the friable roof. Sometimes individual headers are used with each bolt and other times a 4- to 5-ft-long header is installed with two bolts. Steel crossbars and single posts have been used to supplement roof bolting. A steel crossbar always is set at the face as soon as a cut of coal has been loaded.

TRANSPORTATION

Section haulage, as noted, is handled by shuttle cars delivering to 36-in belt conveyors. Room-panel belts extend 2,000 ft and handle production from two loading units. Each 2,000-ft unit is powered by a 40-hp 1,750-rpm 275-v Reliance motor transmitting power through a Cleveland Speedair worm-gear reducer. A total of eight 36-in Barber-Greene belts are available for underground service. Two of these frequently are used as stub transfer units to carry coal from entry-development belts to mine cars. When used for transfer duty, the belts are powered by 15-hp motors. All belting is U. S. Giant brand.

Six locomotives handle 8- to 14-car trips between the car-loading points and the shaft. Assigned to the track-haulage job are two 15-ton Jeffrey, one 13-ton Goodman and three 10-ton Goodman locomotives. To provide better communication between locomotive operators and dispatcher, haulage units are equipped with trolleyphones. Both General Electric and Femco phones are used. After delivery to the hoisting shaft, mine cars are dumped singly by a Connellsville rotary dump discharging into either of two 8-ton skips for delivery to the preparation plant.

Track is laid with 60-lb rail throughout the mine, except around the hoisting shaft where 90-lb rail is installed. All track is double-bonded when it serves as the return for the DC power circuit.

AUTOMATIC HOISTING

Coal hoisting at Crown mine is handled by a high-speed, balanced, automatic unit. The 1,000-hp unit is designed to lift 800 tph of coal up a 491-ft vertical shaft. That is 8 tons of coal every 36 sec. Rated rope speed is 1,357 fpm.

Constructed by the Vulcan Iron Works, Wilkes-Barre, Pa., the hoist alternately handles two skips, each weighing 7½ tons and carrying 8 tons of coal. The unit has a cylindrical drum with each end grooved for 1¾-in rope. Each compartment is 10 ft in diameter with a 3-ft 6-in face. A parallel-motion hydraulically operated post-type brake is mounted at the center of the drum.

Hoist controls are General Electric amplidyne type and consist of a 1,000-hp, 500-rpm DC drive motor and a 750-kw m-g set consisting of a 4,160-v synchronous motor and a 500-v DC generator. The hoist does not require an operator on the surface, all movement being controlled by pushbutton from the shaft bottom. Incorporated in the hoist controls are positive devices that provide complete protection against power failure, overspeeding and over-winding.

VENTILATION

Air for Crown mine is supplied by a Jeffrey 7-ft axial-flow fan capable of delivering up to 250,000 cfm at a 4-in water gage. At present, the unit is operating at about 50% of capacity. Air enters the mine through the air shaft and is directed to the three middle headings of the 7-heading system. Thus, all track haulage is on intake air. There are two return-air headings on each side of the intakes to permit easy splitting of air when necessary. Each belt is ventilated by a separate split of air and each group of active working faces also is ventilated by a separate split. Air returns to the surface through the main hoisting shaft.

PREPARATION

Complete preparation facilities, including wet and dry cleaning methods, were selected to upgrade Illinois No. 6 coal to maximum quality at Freeman's Crown mine. Included in the Crown plant are jig washing of plus 1¼-in, air tabling of 1¼x0, crushers for primary and secondary crushing and heat driers for pre-drying of coal prior to air tabling.

Raw coal is discharged into a R-O-M surge bin. From there, an apron feeder delivers it to a combination scalping screen and picking table. The coal is separated into plus 6-in and minus 6-in fractions, and the larger size is hand-picked before passing either to a conveyor leading to the No. 1 loading track, or to a McClanahan & Stone single-roll crusher for reduction to minus 6-in and diversion to the raw-coal belt conveyor, where it joins the 6x0 from the scalping screen.

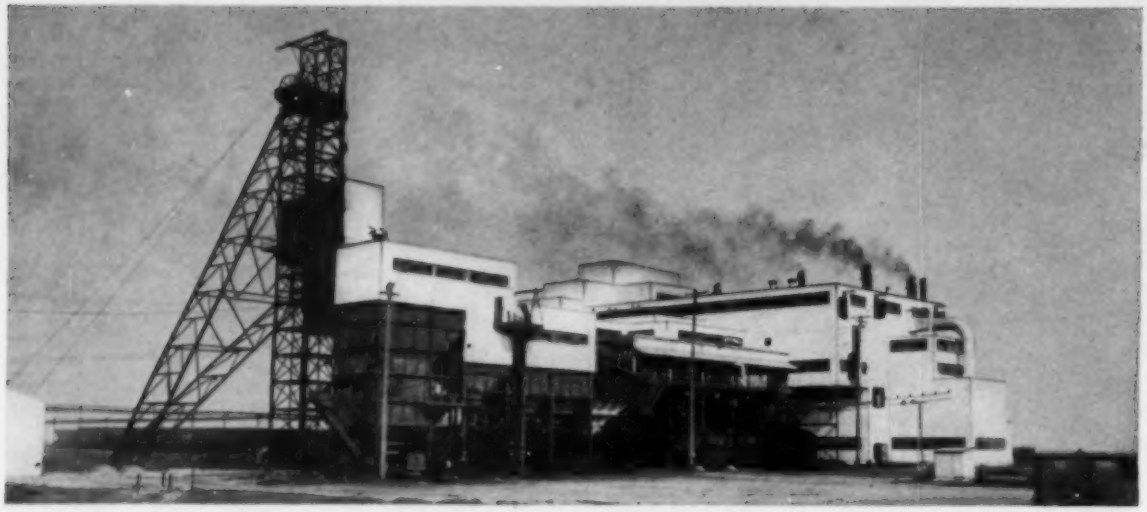
The 6x0 is delivered to a shaking screen where it is separated into 6x1¼ and 1¼x0 products. The larger size is delivered to the wet-washing plant and the 1¼x0 is conveyed to the dry plant.

COARSE-COAL WASHING

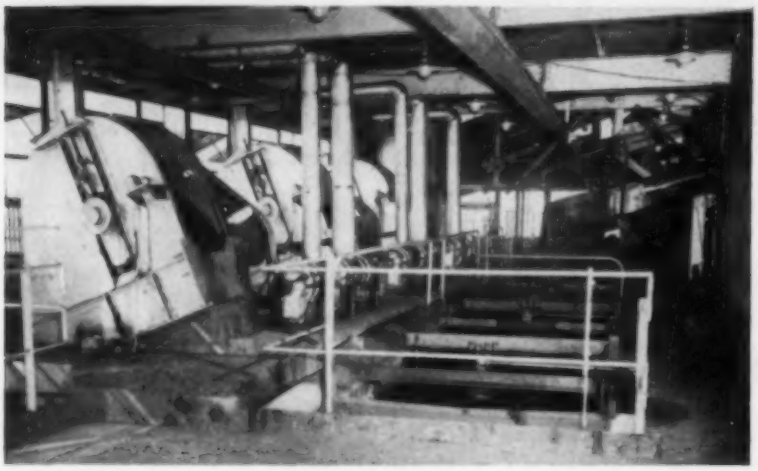
An 8-cell 3-compartment Jeffrey Baum-type jig separates the 6x1¼ coal into clean coal, middlings and refuse. Refuse passes directly to the refuse conveyor and is delivered to the refuse bin. Middlings may be directed either to refuse or to an Allis-Chalmers 5x10-ft Ripl-Flo vibrator that separates it into 6x1½, 1½x⅜ and ⅜x0 fractions. The 6x⅜ is carried to an American Pulverizer single-roll crusher that reduces it to 1¼x0 for recirculation to the jig. Undersize middlings is passed to the refuse belt.

Clean coal passes over a stationary screen that removes minus ⅜-in slurry before it is delivered to a Parrish-type dewatering and classifying screen that separates it into 6x3; 3x2 and 2x1¼ or 3x1½; and 1¼x⅜ products. A mixing conveyor permits each of these sizes to be loaded separately, mixed or returned to an American Pulverizer ring crusher for reduction to 1¼x0.

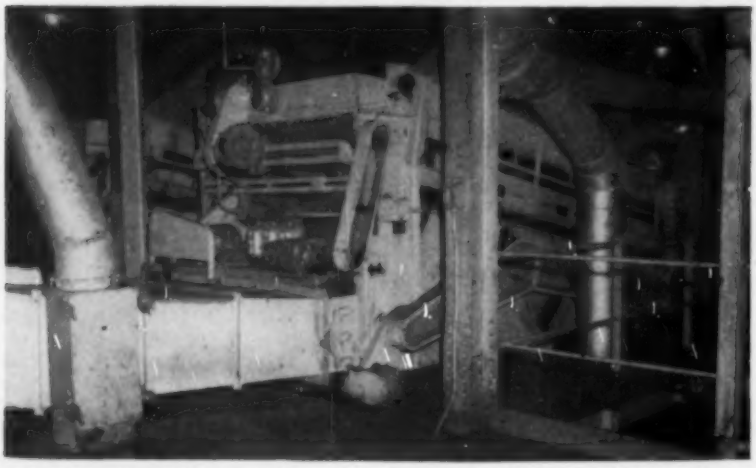
When 1¼x0 is made, it is fed to a pair of 6x16-ft Allis-Chalmers Ripl-Flo vibrators that separate it into 1¼x⅜, ⅜x¼ and ¼x0 fractions. These sizes may be loaded separately or mixed in vari-



UPGRADING CROWN COAL to top grade is handled in this 800-tph preparation plant. Jig washing, air tabling, crushing and thermal drying are features. Also included are facilities to serve local trade with four sizes of coal.



WET WASHING is handled by 8-cell 3-compartment jig that makes a 3-product separation of coarse coal.



AIR-CLEANING UNITS separate predried raw coal into clean coal, middlings and refuse. Coal is sized before passing to tables.

ous combinations as desired.

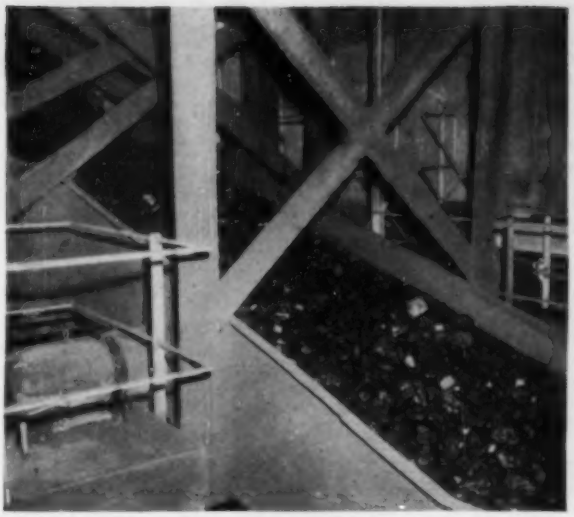
The clean 1½x¾ from the Parrish-type screen may be loaded directly or further separated into 1½x⅝ and ⅝x¾ by diverting it to a 6x16-ft Allis-Chalmers Low-Head vibrator. If separated, the resultants are combined with the 1½x⅝ and ⅝x¾ crushed products before passing to railroad cars. Combined minus ¾-in from the classifying screen, stationary screen and rescreen vibrator is pumped to a sludge settling tank. Overflow passes to a surface pond for further settling and the underflow is directed to a single-deck Allis-Chalmers Low-head vibrator equipped with a 24M screen. Plus 24M joins raw 5/16x0 on the raw-coal conveyor for delivery to the thermal drier. Undersize material is returned to the settling tank.

Loading booms on Tracks 1, 2 and 3 are of the scraper type and are so constructed that they may discharge either to railroad cars or to a battery of four bins serving truck customers.

Crown's prepared coal has met with very favorable acceptance among local trade. Crown's ⅜x¼ stoker coal is a special product that is receiving favorable acceptance both among the local trade and Midwest market.

DRY CLEANING

Raw 1½x0 is distributed to a battery of two double-deck 6x16-ft Allis-Chalmers Ripl-Flo vibrating screens that separate it into 1½x¾, ¾x5/16, and 5/16x0 sizes. The largest product is transported on the upper strand of the 1½x5/16 raw-coal distributing conveyor and may be discharged either to a surge bin leading to a Super-Airflow cleaner or to the recirculating conveyor for delivery to the wet-washing



COARSE-COAL classifying screen separates wet-washed coal into four products...

VIBRATING SCREEN separates 1½x¼ coal from the jig into 1½x⅜ and ⅜x¼ products.

section. The raw ¾x5/16 is carried to a surge bin feeding the ¾x5/16 Super-Airflow units.

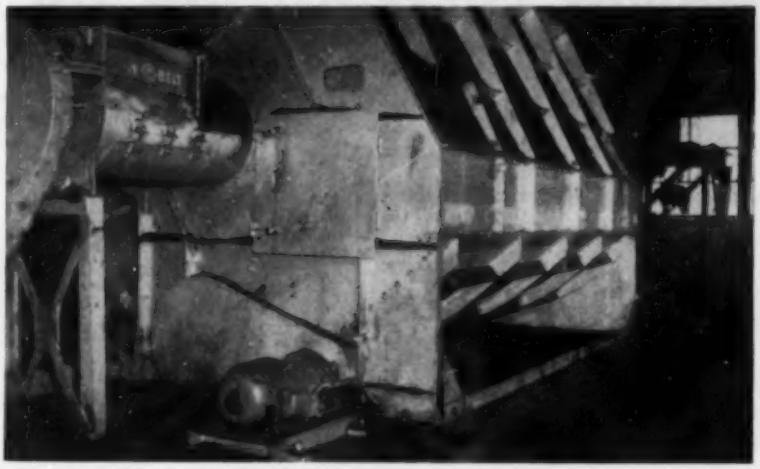
Minus 5/16-in raw coal is mixed with the ½x24M from the slurry screen and conveyed to a Link-Belt Multi-Louvre thermal drier capable of handling 140 tph. If the raw product is dry, it may be by-passed directly to the 5/16x0 dried-coal conveyor and delivered to an elevator that discharges onto the raw-coal distributing conveyor feeding the 5/16x0 vibrators. The 5/16x10M and 10Mx0 products are delivered to their respective Super-Airflow cleaners.

The 1½x¾ and ¾x5/16 air cleaners separate the raw coal into clean coal, middlings and refuse. Clean coal is conveyed to belt loading booms on Tracks 4 and 5. Middlings are recirculated to the air-washing plant.

Refuse is carried to a single-deck vibrator and separated into 1½x5/16 and 5/16x0 products. The larger product is directed to the wet-washing section and retreated. The 5/16x0 may be recirculated and retreated in either the wet or dry plants or may be passed directly to refuse.

The 5/16x10M and 10Mx0 Super-Airflow units also make a 3-product separation. Clean coal joins clean coal from the 1½x¾ and ¾x5/16 units and dust from the cyclone dust collectors and is loaded on Tracks 4 and 5. Middlings are recirculated to the air-cleaning units. Refuse joins waste from the 1½x¾ and ¾x5/16 units and is retreated.

Push-button control of coal loading at Crown is provided by five Brown-Fayro Brownie Model HKG hoist-retarders. Also included in the plant is a Brown-Fayro cold-oil spraying system for dustproofing coal as it is loaded.



HEAT DRIER handles 140 tph of 5/16x0 coal before it passes to air tables.

PLANT CONTROL

Three 1,000-kva 4,160- to 480-v 3-phase 60-cycle General Electric Pyranol indoor-type transformers supply power to 146 motors in the Crown preparation plant. Each substation feeds a section of the General Electric Cabinetrol control center located above the transformers. These controls house starters for all motors driving the wet- and dry-cleaning sections. Two additional control centers in other locations provide controls for coal-loading and drying facilities.

One unit in the boom-operator's room contains controls for the truck-trade conveyor, loading booms and car hoists. The other is located at the thermal drier and contains the necessary starters for the unit. Featured in the plant controls are sequence starting and electrical interlocking to prevent improper plant operation. However, for emergency purposes or maintenance, it is possible to remove any unit from sequence by operating selector switches on the panel board.

Did You Know?

U. S. coal mines continued to pace all consumers of industrial explosives in 1953, with 32% of the record total of 790,810,690 lb.

Since 1800, West Virginia has mined enough coal to build a solid wall around the state 4 ft 8 in wide and 17 mi high.

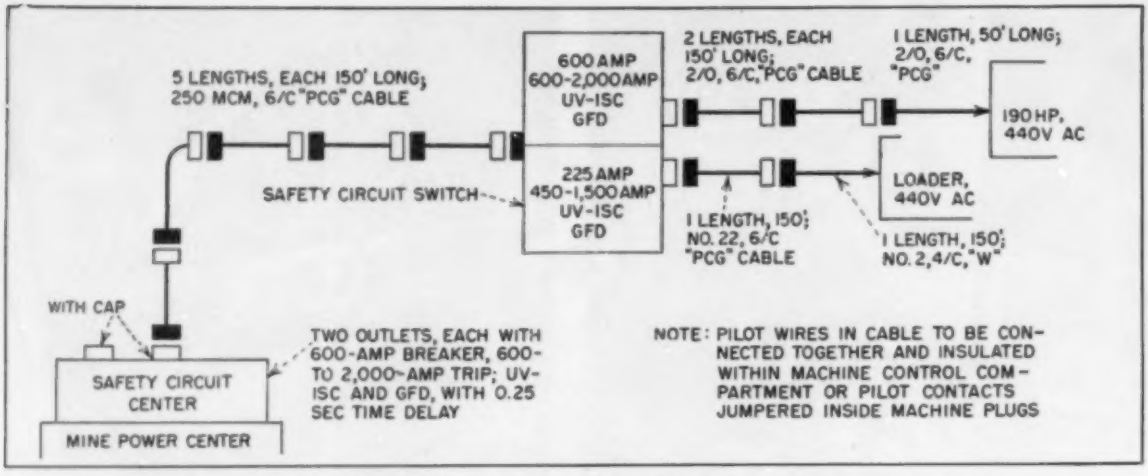

5 LENGTHS, EACH 150' LONG; 250 MCM, 6/C "PCG" CABLE
600 AMP 600-2,000 AMP UV-ISC GFD
225 AMP 450-1,500 AMP UV-ISC GFD
2 LENGTHS, EACH 150' LONG; 2/0, 6/C, "PCG" CABLE
1 LENGTH, 50' LONG; 2/0, 6/C, "PCG"
190 HP, 440V AC
LOADER, 440V AC
SAFETY CIRCUIT SWITCH
1 LENGTH, 150'; NO. 22, 6/C "PCG" CABLE
1 LENGTH, 150'; NO. 2, 4/C, "W"
WITH CAP
SAFETY CIRCUIT CENTER
MINE POWER CENTER
TWO OUTLETS, EACH WITH 600-AMP BREAKER, 600- TO 2,000-AMP TRIP; UV-ISC AND GFD, WITH 0.25 SEC TIME DELAY
NOTE: PILOT WIRES IN CABLE TO BE CONNECTED TOGETHER AND INSULATED WITHIN MACHINE CONTROL COMPARTMENT OR PILOT CONTACTS JUMPERED INSIDE MACHINE PLUGS

FIG. 1—MODERN SETUP for AC power distribution underground.

Power Distribution for AC Mining

Design for higher voltages provides safety for men and equipment and permits ready circuit extension by sectionalized cable lengths.

BY R. G. GEHLSEN
Manager, Sales Engineering
Electrical Connector Div., Joy Mfg. Co., St. Louis, Mo.

THERE IS a definite trend toward AC power for large underground mining machines. As a result of the heavy demands of these machines, 220-v service has been found inadequate. Consequently, considerable research and development have been carried on and have brought about a system employing 440 v in the United States and 550 v abroad.

With these higher voltages, even greater attention must be devoted to the safety of men and equipment, while at the same time providing circuits that can be readily extended through sectionalized cable lengths.

What goes into such a system, proved successful by many users, is the subject of the following material. The goal is better distribution to maintain proper voltage at the machine terminals, in turn providing these benefits: Maximum tonnage per man, low maintenance, and a minimum of open arcing in possible hazardous atmospheres.

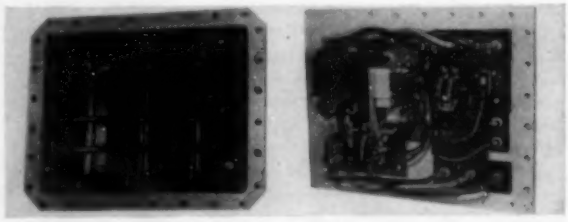
Equipment for the AC System

Basic in the system under discussion, for AC at 220, 380, 440, 500 and 550 v, 50 and 60 cycles, are "power-distribution centers" consisting of three basic units:

1. Explosion-tested compartments having automatic circuit breakers, motor starters and auxiliary control apparatus.

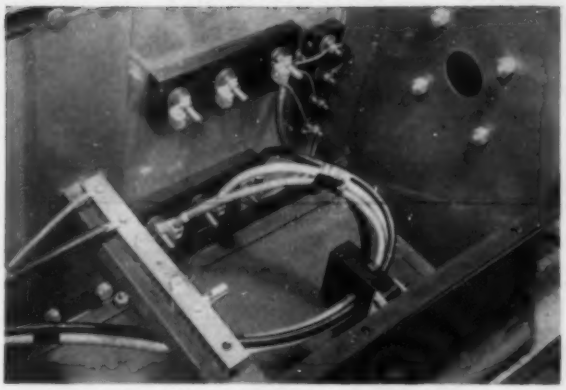
2. A wiring chamber providing mechanical protection for internal wiring and certain circuit-protective devices.

3. Skid assembly for ease in transporting the complete centers from one location to another.



Explosion-Tested Compartments—The need here is for a design that will meet not only U.S. Bureau of Mines requirements but also units that will stand up to the wear, shocks, and galvanic and corrosive actions to be expected in service. Bureau testing, under Schedule 2E, amended, consists principally of a series of tests with both methane and coal dust in the compartments. With methane, the compartment must withstand the ignition of 8.6 and 7.0% methane in the compartment without igniting 8.6 and 7.0% methane atmospheres outside the compartment. Similar standards govern ignition of coal dust in the compartment, and the tests, totalling 20 to 40, must be accomplished without permanent physical distortion of the compartment metal.

Special aluminum alloy is used for added compartment strength, and protection against galvanic or corrosive action is provided by a special aluminum finish. Flange surfaces are smooth-faced for close fits with associated back plates forming explosionproof compartments. Assembly standards require that the flange gaps not exceed 0.004 in, nor extend more than 6 in along any one joint. Castings are secured to back plates with a number of steel cap screws with lock washers for rigidity. Each final compartment assembly is checked against "inspection sheets" to insure compliance with bureau requirements.



Wiring Chamber—Adequate protection for all circuit components and wiring within the chamber, along with ability to withstand the conditions encountered in mining service, are the goals in design. Thus, the chamber is fabricated from 12-gage mild steel with adequate reinforced points. All joints are welded to make the assembly waterproof along the lower surfaces and provide dusttight flanges for bolting. Together with the explosion-tested compartment assemblies and the steel cover, the resulting assembly also is dusttight. Interior surfaces are coated with a protective sealer to insure against rusting.

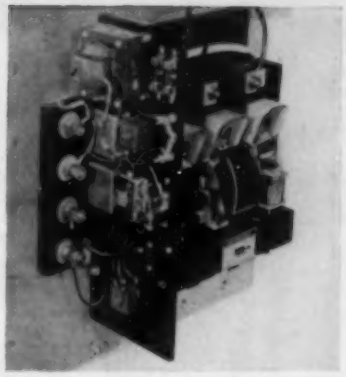
Skid Assembly—The aim is a skid capable of giving long life under the adverse conditions found with mine floors. The skid is constructed of formed standard-weight pipe electrically welded for maximum strength. The finish consists of a rust-inhibiting primer and several coats of machinery enamel. The final assembly is securely bolted to the wiring-chamber assembly.

Attachable Connectors molded of neoprene with receptacles and metal coupling parts are used throughout the assembly of a power-distribution center. The individual contact parts of the receptacles are securely anchored in a neoprene body with sealed-in flexible leads. They have mating attachable connectors in the portable class, and are held together by rugged coupling parts which permit joining large-sized cables with little effort in a few seconds.

The portable connectors and receptacles are equipped with power contacts, ground contact and two "pilot contacts." The function of these latter contacts will be explained later in this material. However, application of the connectors requires that the pilot contacts make *after* and break *before* the power contacts. This permits the control devices to function before the power circuit is interrupted.

Cable—Hereafter designated as Type PCG, the cable used with the units has a neoprene jacket and is listed by the Bureau of Mines as "flame-resistant." It includes full-sized power conductors, half-sized ground and two No. 10 pilot wires, and is available with and without screen over the power conductors.

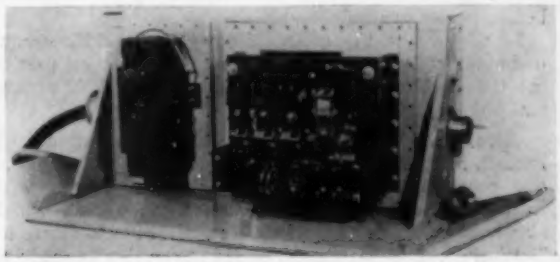
The Electrical System



The electrical system associated with the distribution centers is briefly as follows:

Circuit Breakers—Automatic circuit breakers are used throughout the system, providing quick, accurate and dependable protection for the cable and equipment served. The breakers are easily reset after tripping resulting from cable failures, and power is restored in a matter of seconds. Resetting is accomplished by an external handle, which operates the breaker handle within the enclosure.

Breakers are equipped with adjustable magnetic trips which make it easy to match tripping action to machine characteristics. Trips are set at the factory for various machines, and normally will not require changes in the field, except for adverse conditions not usually encountered. Breakers are available in several sizes: 100 amp, 225 amp and 600 amp. Each is equipped with an auxiliary device for controlling breaker position (opening or reclosing manually). This device is an undervoltage release, a component of the "intrinsically safe circuit" to be described later.



Motor Starters—Latest-design starters are used in the explosion-tested compartments, with provision for external resetting of the overload devices mounted on these starters. Assemblies are fabricated to mount appropriate starters. Sizes are up to 200 hp, 440 v, or the No. 5 size line starter. Compartments housing these units are mounted as part of the distribution centers, thereby permitting flexible installations. Incorporation of the "ISC," or "intrinsically safe control" circuit, permits remote control of the starters from several points. Many combinations of circuits are possible.

Intrinsically Safe Control Circuit—Opened and closed in 8.6 and 7.0% methane-gas mixtures hundreds of times by the U.S. Bureau of Mines without creating an incendiary arc, the ISC circuit (Fig. 2) is composed of the following:

Control transformer, TR.
Doubler rectifier, RA.
Capacitors, C.
Undervoltage release, UV.
Fuses, F.

The control transformer supplies 24-v AC to the doubler rectifier which, in combination with the capacitors, pro-

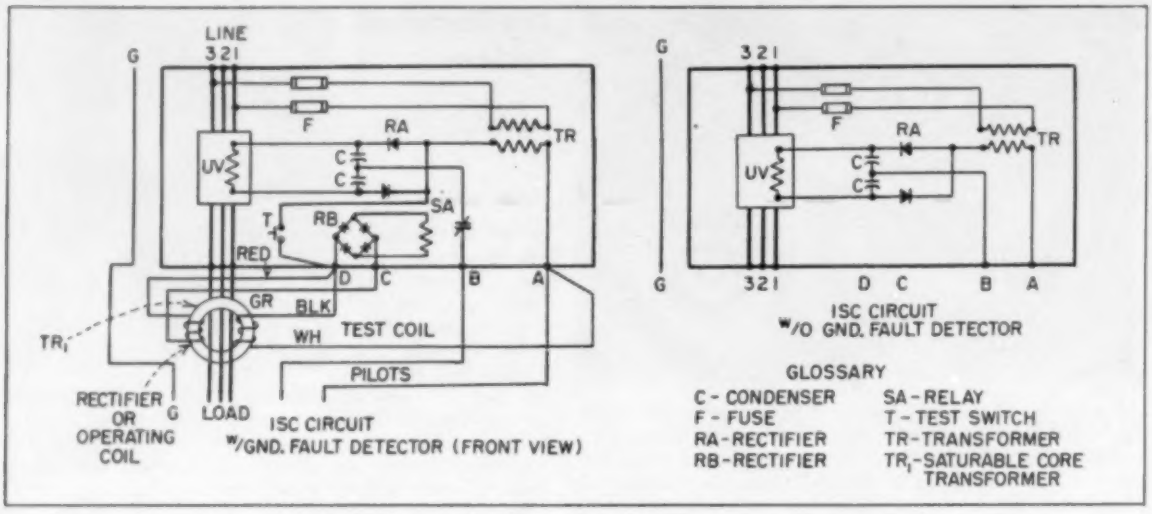


FIG. 2—AC CONTROL CIRCUITS with and without ground-fault detector.

duces a DC voltage adequate to operate the undervoltage release. The circuit components are selected so that the make and break of the control position of the circuit (Points A and B) will not ignite gas. Points A and B are the terminals of the circuit through the PCG cable from the short-pin "pilot contacts" in the cable connector, thus creating a connector that will drop the main load before the main power circuits are opened as the connector is pulled apart. Conversely, the connector must be closed before power can be re-established.

In addition to the control feature of the ISC circuit, undervoltage protection is provided as an inherent part of the UV auxiliary. Drop out is approximately 50% of normal voltage; pick up, approximately 65%.

Alternate ISC Circuit—The alternate ISC circuit utilized in motor-starter enclosures is essentially the same as that previously described. The control transformer with fuses and a sensitive relay comprise the circuit, which also has been tested by the Bureau of Mines to insure its "intrinsic" safety features. The sensitive relay is made to operate a second heavier relay whose contacts control the holding coil of the starter. This circuit is used for remote control of the starter from such locations as the car spotter and the like. The intrinsically safe control circuit may be terminated in push-button stations, alterlocks or such other control device as may be required.

Extension of any of the previous circuits is thus accomplished through the pilot wires. The connectors permit deliberate uncoupling without danger since the action of the pilot contacts removes the load before the power contacts are disengaged within the connector body.

Ground-Fault Detection

Components associated with ground-fault detection are illustrated in the left-hand section of Fig. 2. The equipment operates with a phase-to-ground fault of approximately 7.5 amp on the machine frame, thus protecting the operator. Physically, the protective circuit includes the ground-fault detector coil, bridge rectifier (RB) and sensitive relay (SA).

The ground-fault detector coil is rigidly mounted in the wiring chamber area where the three phase leads from the load side of the specified breaker pass through the center of the coil.

The neutral, or ground, connection does not pass through this opening and must not for proper operation.

The coil consists of a toroidal-wound core with two windings: test and rectifier. The rectifier winding is directly connected by additional control studs to the bridge rectifier mounted within the enclosure. The output of the rectifier is further connected to the sensitive relay whose contacts, normally closed, are inserted into the extended control circuit of the undervoltage release. It can be seen, therefore, that with the normal flow of current through the mounted coil required for the operation of the motors and other components on the mining machine there will be no unbalanced currents to produce induced voltages in the rectifier windings.

The creation of a fault to ground on the machine frame will produce an unbalanced condition resulting in an induced voltage in the rectifier winding. This voltage will be rectified and result in the operation of the sensitive relay, SA, causing the undervoltage release circuit to be opened. This will open the breaker feeding the affected machine and remove it from the line. In turn, the ground fault is removed, giving the machine operator quick, positive protection. From the maintenance standpoint, it is desirable to check the operation of the ground-fault detector periodically.

In line with this desirable maintenance feature, the test-circuit push button is part of the enclosure to facilitate checking the protective circuit. When the push button is closed, the effect of applying the control-transformer voltage to the test winding is the same as a simulated fault. The rectifier winding, through transformer action, then receives the same induced voltage, resulting in the opening of the breaker. This periodic checking can be done by the safety engineer merely by depressing the "Gnd Test" button on the exterior of the enclosure.

a page out of the cost book

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COAL AGE

FOREMEN'S FORUM

THE GOOD SUPERVISOR takes time to stand off for a searching look at his whole job every once in a while.

Integrated Supervision

A supervisor approaches perfection in his job when he can weld all elements of leadership into smooth-flowing guidance for the workmen and their machines.

AN INTEGRATED OBJECT OR EFFORT is one which is made up of a number of parts combined into a perfect unity. Integrated supervision is that which displays all the separate supervisory skills blended into smooth, purposeful guidance of a group of workmen and their covey of machines. It's the kind of supervision all enterprises hope to achieve. That's our definition of terms upon which we base this month's discussion.

What brings this up?

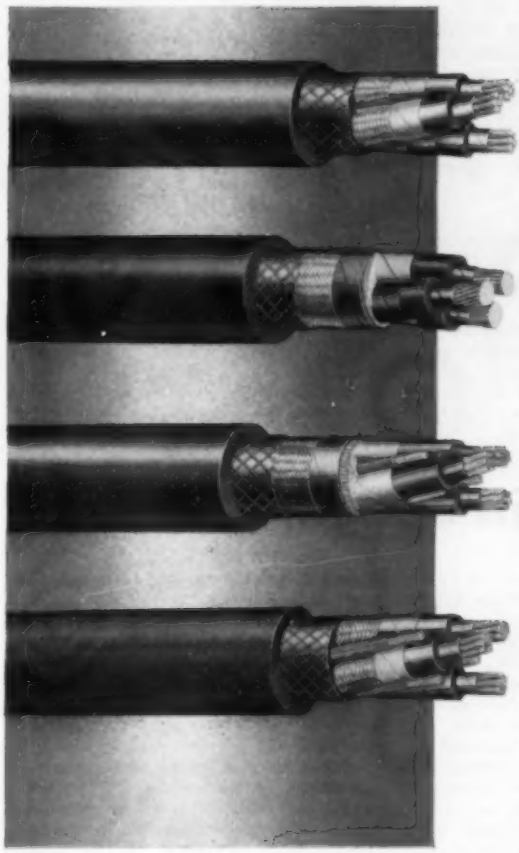
Well, you no doubt recall that 2 mo ago we talked over this matter of job-organization in Foremen's Forum. The purpose then was to break down your job into its basic elements in order to better examine the specific requirements of your position. But we would rather not leave it that way since we do not advocate jerky, stop-and-go supervision. Here and now we hope to lay out some examples, showing how the various elements of your job are intertwined.

There is a fuzzy parallel here with the branch of mathematics known as calculus, a subject many of you will recall as hardest to learn and easiest to forget. In differential calculus, the introductory phase of the study, one learns to reduce mathematical concepts down to smallest proportions to permit closer examination, so to speak. In integral calculus, the follow-up phase of the study, one learns to recombine the small elements to arrive at useful answers. Two months ago we differentiated, now let's integrate.

Take the classic example of the mining cycle. It consists of a number of elements such as cutting, drilling, blasting, loading and roof support. You must give each of these elements a lot of attention, but to produce coal you must be able to visualize the entire job. In your mind's eye, you must be able to see the elements as a smooth-flowing combination.

There is a possibility that if one places too much mental emphasis on the elements, he will be tempted to relax in winding up one phase of the work and getting started on the next. In other words, completion of a cut across a room face is not really a goal, it is only a

Avoid costly "Downtime" with U. S. Royal Shielded Trailing Cables



U. S. Royal SH-A Cables consist of three or four flexible coated annealed copper conductors covered with a semi-conducting tape. Each conductor is insulated with U. S Uskorona-1 oil base compound, and covered with colored tapes and a braided coated copper shield. The conductors are then cabled and covered with a reinforced jacket of 60% black neoprene. The shielded braid over each insulated conductor eliminates corona cutting by static discharge through equalization of surface stresses.

SH-B cables consist of three or four flexible coated annealed copper conductors covered with a semi-conducting tape. Each conductor is insulated with U. S. Uskorona-1 oil base compound plus colored tapes. Conductors are then cabled with jute fillers, covered with a rubber-filled tape, a braided coated copper shield and reinforced 60% black neoprene jacket. The shielding braid protects the men handling the cable in the event of fault currents.

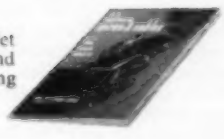
SH-C cables consist of three or four flexible coated annealed copper conductors covered with a semi-conducting tape. Each conductor is insulated with U. S. Uskorona-1 oil base compound and covered with a colored tape. The conductors are cabled with jute fillers and with the specified fabric-covered ground wires in the conductor interstices; then covered with a rubber-filled tape, braided coated copper shield and a reinforced 60% black neoprene jacket. This allows grounding of equipment and provides an adequate low-resistance path for short circuits, thus insuring circuit breaker operation. The grounded equipment provides protection to workmen under fault conditions.

SH-D cables consist of three or four flexible coated annealed copper conductors covered with a semi-conducting tape. Each conductor is insulated with U. S. Uskorona-1 oil base compound and covered with a colored tape and a braided coated copper shield. The conductors, together with fabric-covered grounding conductors, are cabled and covered with a reinforced black 60% neoprene jacket. The conductor shielding, when properly grounded, equalizes surface stresses and draws off all capacity charging currents, insuring safety in handling. An adequate low-resistance ground for the equipment is provided by the grounding conductors.

All shields and grounding conductors, when used, should be properly and thoroughly grounded.

The constant dragging, flexing, twisting and bruising encountered in heavy service will not bother U. S. Royal Shielded Cables. You'll find that U. S. Royal never runs you into "downtime"—it's the most dependable, efficient cable you've ever used.

United States Rubber Company is the only electrical wire and cable manufacturer to grow its own natural rubber, make its own synthetic rubber and its own plastics. This permits control of the production process—resulting in a quality product.



Send for illustrated booklet on U. S. Electrical Wires and Cables for the coal mining industry.

UNITED STATES RUBBER COMPANY
ELECTRICAL WIRE AND CABLE DEPARTMENT, ROCKEFELLER CENTER, NEW YORK 20, N. Y.

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subgoal. The real goal, insofar as the section is concerned, is placing loaded mine cars at the parting or placing broken coal onto a moving main belt conveyor.

Therefore, the job is only half done when the cycle has been broken down into its elements to permit examination of each element for high costs and unnecessary delays. The other half of the job requires that these curry-combed elements be reassembled into a smooth production effort. Integration demands proper emphasis on both the elements and the full cycle.

Here is another example.

If a stranger-to-mining visits your section, he sees only a succession of coal walls hemming him in, with openings right and left appearing at rather definite intervals. But the section appears quite different to you because you know the difference between a heading and a crosscut, even though they may look alike at any one intersection. The rib is a blank wall to the stranger, but you can see, in your mind's eye, other pillars and openings beyond. You can visualize men and machines working at active faces perhaps far removed from your present position.

You can do this because, consciously or subconsciously, you are constantly orienting yourself in relation to the mine map. You know where every local dip in the haulage road occurs. You are familiar with each grade where gathering locomotives must use traction sand. You know exactly how far you would have to travel to visit the next loading point; perhaps you can even visualize the man in attendance there.

It's a toss-up as to whether you became completely familiar with the map as a result of your intimate knowledge of the section or became familiar with the section because of your knowledge of the map. Both experiences are necessary, and that is integration.

Now let's see how integrated supervisory attitudes enter into this picture. Setting the stage for us is H. A. Quenon, division manager, Eastern Gas & Fuel Associates, Beckley, W. Va. In his remarks at the most recent West Virginia Statewide Safety Conference, where he discussed the interdependence of high morale and good safety performance, Mr. Quenon said:

". . . Accident prevention is a management function inseparably interwoven with other functions in the field of industrial relations or personnel administration. It is useless to debate how much a safety campaign contributes to improved labor relationships or whether better personnel administration automatically tends to reduce accidents. It is equally futile to argue whether safety or certain other aspects of personnel administration ought to be started first in a new organization or emphasized most in an established organization where improvements are sought.

". . . Possibly what is most needed . . . are more personnel administrators who have a practical working knowledge of the field of accident prevention as well as more safety engineers who are intelligently and constructively paying attention to personnel problems and labor policies."

That is a plea for an integrated approach in achieving the desirable goals of higher morale and fewer accidents. Mr. Quenon's point is that a good safety engineer, for example, is not exclusively concerned with workaday details. He is constantly reaching out for new knowledge he can use in accident prevention. And he integrates this new knowledge into his full-blown attack on accidents.

Here is a final example. We ask you to refer to the front cover of this issue, where you see the work-pad of a coal-company official. On one side he has set down the major problems confronting his organization, and on the other side he has listed his management team. He is not merely assigning jobs, he is selecting the skills that should be brought to bear on the problems. His most valuable asset is his integrated staff, a treasury of the skills and talents needed in a mining company.

The individual supervisor can use similar methods. He is equipped with training and experience sufficient to meet almost any situation that might arise. He is a man of parts and these parts are blended into an effective unity. Facing a problem, he confidently selects the personal skills he will need to arrive at a solution. He is not flustered, even in emergencies.

Is there a common characteristic displayed by such steady foremen?

We think so. This type of foreman appears to have a happy faculty for quickly identifying the heart of a problem. He isn't easily sidetracked by extraneous detail. He quickly separates causes from effects.

How does he get this way?

First and foremost, he seems to have the ability to stand off and take a good look at his whole job every once in a while. He sees it as a unit, then he can better examine it in detail to search out shortcomings.

This is integrated supervision. It approaches perfection.

Tip of the Month . . .
How to Clean Panfish

WE BRING YOU THIS from the pages of the June issue of the *Safetygram*, a publication of Bell & Zoller Coal Co.:

Quick cleaning of panfish—All small fish are messy to clean and scale in the usual way. This stunt will save time and tempers as well as leading fishermen to eat more panfish rather than give them away or discard them, as often happens.

Take fish just caught; make a single cut down the back from head to tail, another alongside dorsal fin. Now cut through the back of head, through backbone, and loosen the skin of the sides at this cut but don't cut off the head. With the left hand bend the head downward sharply and at the same time insert two fingers of the right hand into the cut, right under the backbone. Pull up with the right hand and the entire usable part of the carcass will come out, leaving head, entrails and skin all in one piece to be discarded.

Errors in Judgment . . .

THREE RECENT ISSUES of the Pennsylvania Department of Mines *Safety Sentinel*, selected at random, present official descriptions of 18 mine accidents which resulted in 20 fatalities. The descriptions are prepared by the state mine inspectors in whose districts the accidents occur. In reading the descriptions, one after another, a reader is impressed by the number of times the accidents are charged to errors in judgment. The sobering theme is repeated over and over. "The experienced miner should have known . . ." "The supervisor should have recognized . . ."

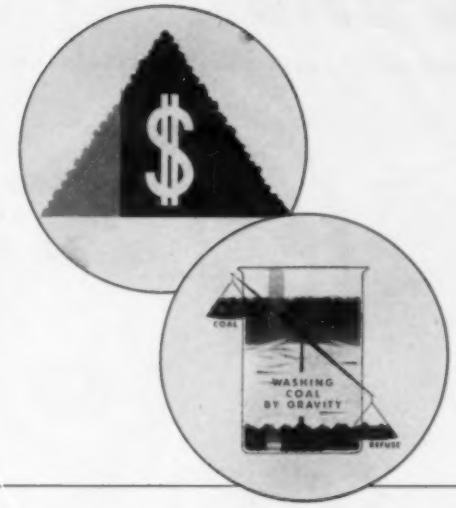
None of the accidents is attributed to lack of knowledge. Most of them appear to be traceable to someone's willingness to take a chance. Many people will do as little as possible to get their work done, but that isn't good enough in coal mining. Meeting mere minimum standards is risky.

Speaking at the June meetings of the Mine Inspectors' Institute of America on the subject of roof falls, still the No. 1 killer, W. R. Cunningham, state mine inspector, Johnstown, Pa., identified the problem as follows:

"In practically every timbering plan, the phrase "more timber where the roof requires" is included. Placing this dependence upon the judgment of officials and miners has been disappointing. In approved roof-bolting plans such on-the-spot judgment is reduced to an absolute minimum because of the maximum requirements of such plans. Why then, should not timbered roof, under which men are killed, be given like or stricter consideration? Presently, such plans are labeled "minimum", and man in his inherent tendency to get by with least effort to himself, will not go beyond such minimum requirements."

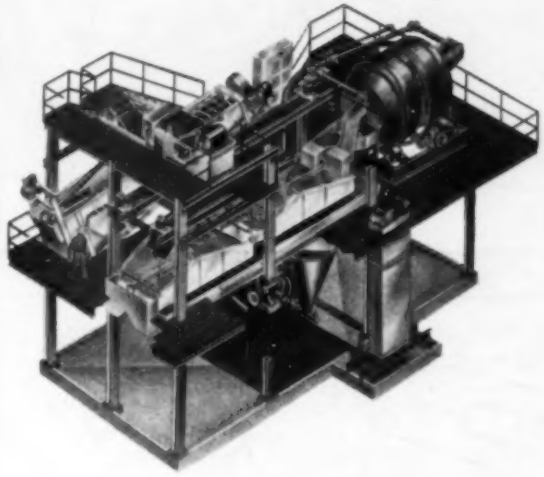
Is there a lesson here for you? If you have a standard timbering plan, be sure to follow it religiously. Then make it a point to look for occasions where extra posts or timbers might be needed. In this matter you can afford to be a hard taskmaster, simply because you can't afford not to be. Roof-control discipline is a serious matter.

CONTROLLED CLEANING produces COAL PROFITS



Profitable coal cleaning in today's market requires control of washing operations with low cost, efficient methods.

The newest, most efficient coal cleaning method for most operations is Heavy-Media Separation with WEMCO MOBIL-MILLS.



You have a choice of three types of Mobil-Mills in selecting a washing plant to fit your particular requirements:

1. **DRUM TYPE MOBIL-MILL** for accurately controlled washing of a full range of sizes from 8" to ¼" with capacities up to 420 TPH.
2. **DOUBLE DRUM TYPE MOBIL-MILL** for efficient cleaning of coal having complicated middling and washing characteristics. Produces a high quality float coal, a carefully controlled float middling and a reject. Capacities dependent on individual problem.
3. **CONE TYPE MOBIL-MILL** for efficient, large volume production of fine coal in sizes 4" to ⅜", with capacities up to 420 TPH.

Prime advantages of WEMCO MOBIL-MILLS for coal cleaning are:

Efficiency of cleaning
Accurate control of operations
Low investment per TPH of washed coal
Low operating and maintenance costs

Call a WEMCO engineer today for complete information on WEMCO test facilities to solve your coal cleaning problems, or write for descriptive bulletin.

Mobil-Mills • HMS Thickeners • HMS Pumps
Cone Separators • Coal Spirals • Sand Pumps
Drum Separators • Dewatering Spirals
Fagergren Laboratory Units
HMS Laboratory Units • Agitators
Hydroseparators • S-H Classifiers • Thickeners
Attrition Machines • Conditioners • Densifiers
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OPERATING IDEAS

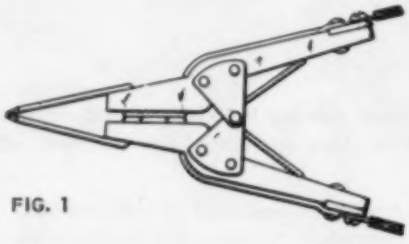


FIG. 1

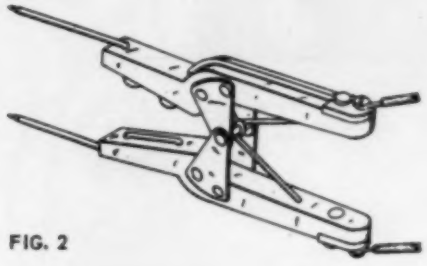


FIG. 2

Shunt Device Increases Safety

POSITIVE SHUNTING of lead wires to prevent accidental detonation of a charge is achieved with this shunt device, invented and patented by Robert T. Burgess, Holden, W. Va.

The hinged unit has two terminals to which are connected ends of the lead wires and built-in shunt conductors. To shunt the lead wires when a charge is being wired at the face, the built-in shunts are contacted as shown in Fig. 1. When a charge is to be detonated, the device is opened as shown in Fig. 2 and the two pointed conductors are connected to the shooting battery. Fig. 3 shows the device turned over to expose the other shunt conductor.

The inventor writes that the invention is available to the mining industry and already is in use at various mines in the West Virginia field.

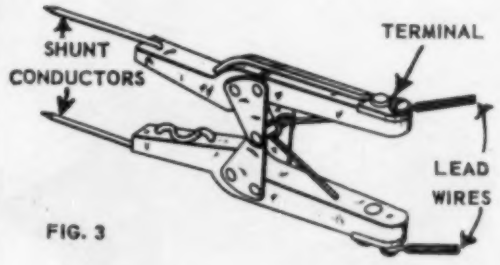
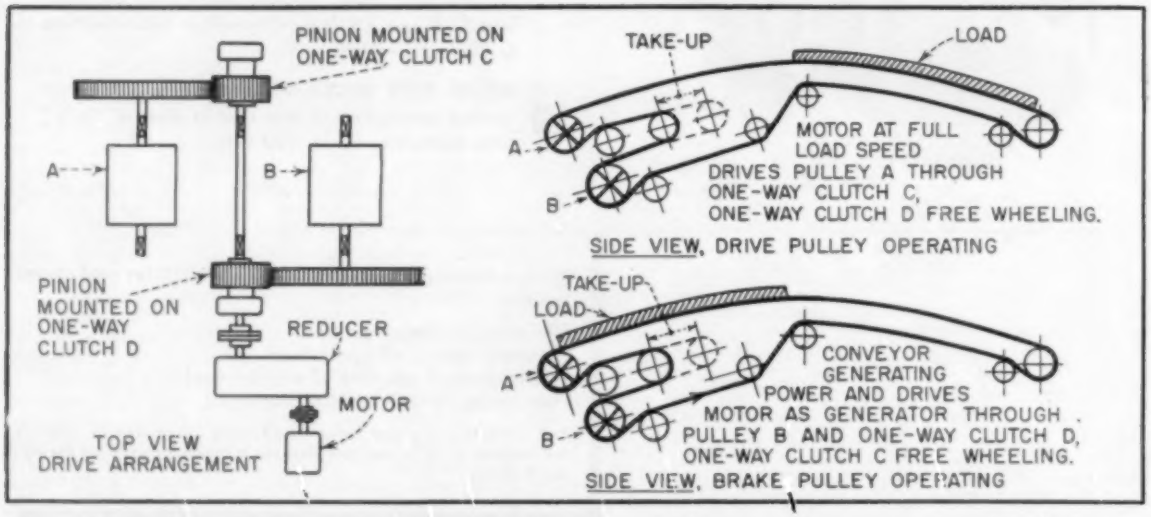


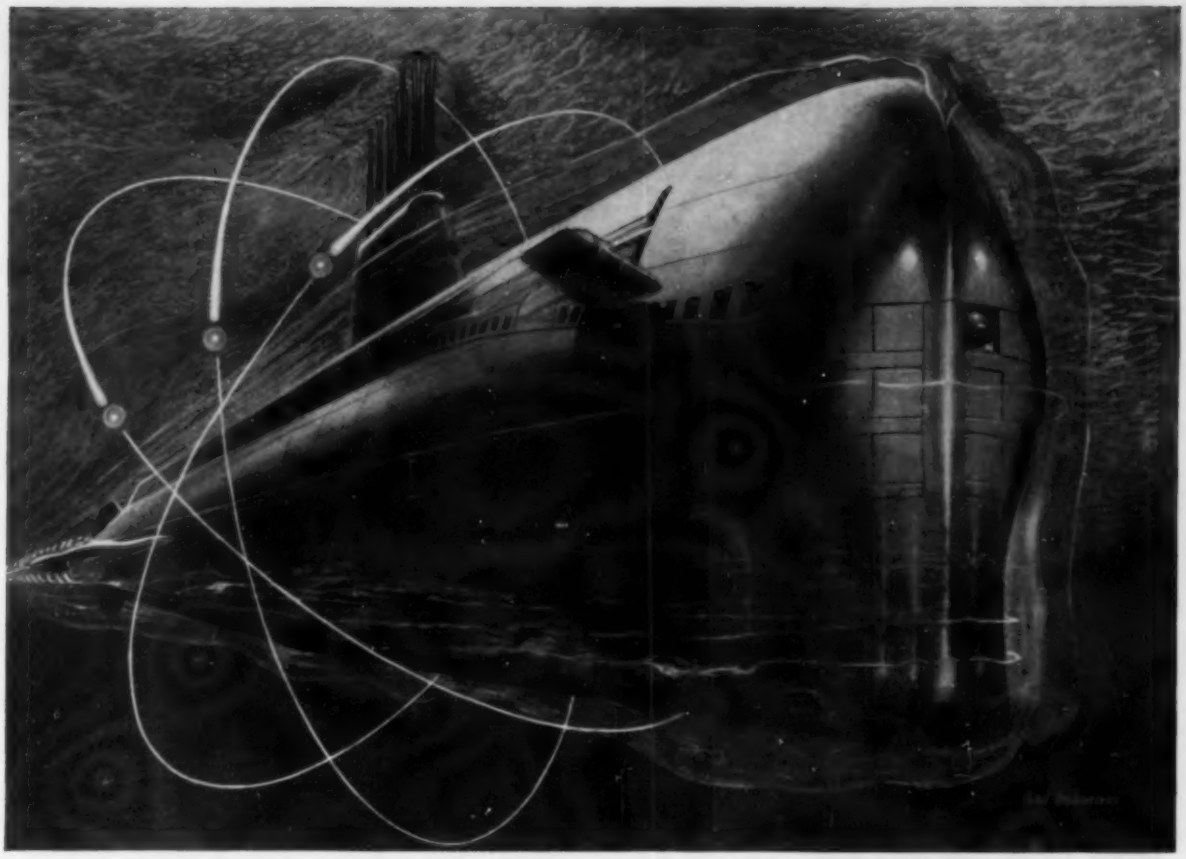
FIG. 3


PINION MOUNTED ON ONE-WAY CLUTCH C
A
B
PINION MOUNTED ON ONE-WAY CLUTCH D
REDUCER
MOTOR
TOP VIEW DRIVE ARRANGEMENT
TAKE-UP
LOAD
MOTOR AT FULL LOAD SPEED DRIVES PULLEY A THROUGH ONE-WAY CLUTCH C, ONE-WAY CLUTCH D FREE WHEELING.
SIDE VIEW, DRIVE PULLEY OPERATING
TAKE-UP
LOAD
CONVEYOR GENERATING POWER AND DRIVES MOTOR AS GENERATOR THROUGH PULLEY B AND ONE-WAY CLUTCH D, ONE-WAY CLUTCH C FREE WHEELING.
SIDE VIEW, BRAKE PULLEY OPERATING

New-Type Drive Permits Use of More Economical Belt

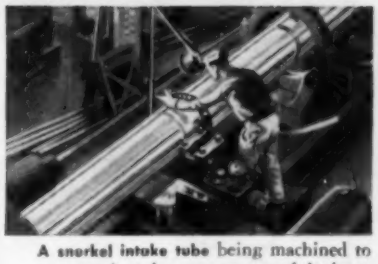
A NEW METHOD of preventing overspeed and runaways on conveyors in hilly country has been perfected by Reinhardt Petterson and L. G. Weygandt, engineers for the Hewitt-Robins, Inc., Stamford, Conn. Used in place of the conventional type of drive, the control relieves strain on the conveyor and permits use of lighter and more economical belts.

The device uses a single motor connected to a drive pulley and a holdback pulley, each equipped with an automatic one-way clutch. When power is required to move a loaded section of the belt uphill, the drive pulley is engaged automatically and the holdback pulley turns freely. When the loaded portion of the belt starts downhill, the holdback pulley is engaged automatically, the drive pulley runs freely and the belt thus continues to run at normal speed.



ATOMIC SUB BUILDERS

Rely on World's Greatest Lubrication Knowledge and Engineering Service



A snorkel intake tube being machined to very precise tolerances on one of the large lathes in the Groton plant.

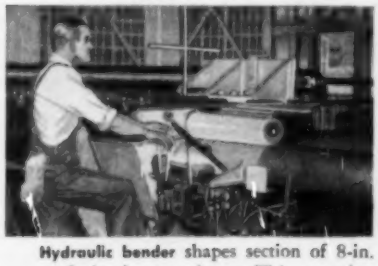
AFTER 54 years of building over 300 "conventional" submarines for the U. S. Navy and our allies, Electric Boat Division, General Dynamics Corp., marks its entry into the atomic age with the launching of the "Nautilus"—world's first atomic powered submarine.

Electric Boat, with its sprawling foundries and shops along the Thames River at Groton, Conn., is really many industries in one. It casts its own metals—both ferrous and non-ferrous. It shapes and machines metal parts—from thick armor plate to parts with microscopic tolerances. It has 27 overhead cranes, marine railway and land railroads, a fleet of trucks, low- and high-pressure compressors, its own Diesel power plant.

This wide variety of costly machinery represents almost every lubrication condition found in modern industry. That is why Electric Boat relies 100% on Gargoyle lubricants and a program of Correct Lubrication—has done so for 34 years.

★ ★ ★

You can give your plant, mine or mill this same unsurpassed protection. Just call your Socony-Vacuum representative.



Hydraulic bender shapes section of 8-in. steel pipe in two minutes. This operation formerly took a full day.

SOCONY-VACUUM *Correct Lubrication*

FIRST STEP IN CUTTING COSTS

SOCONY-VACUUM OIL CO., INC., and Affiliates: MAGNOLIA PETROLEUM CO., GENERAL PETROLEUM CORP.

SOCONY-VACUUM

Do's and Don'ts

. . . To Make Installation Of Hose Couplings Easy

Compiled by the Hewitt Rubber Div., Hewitt-Robins, Inc., Buffalo 5, N. Y.

DO place clamps so they give extra support if hose will be flexed often at the fitting. Be sure the clamps are located over the shank.

DON'T ever groove hose cover or cut back any portion of it to apply a clamp. This weakens the hose and leads to premature failure.

DO cut hose ends squarely. This is necessary to insure proper alignment of hose on coupling shank. Wet blade of knife for easier cutting.

DON'T cut hose at an angle. Don't try to cut hose while holding it in your hand. Always place the hose on bench or other support.

DO lubricate either the hose or the coupling shank. Use either rubber cement or soap. Lubrication makes insertion of the coupling easier.

DON'T use oil, grease or any other petroleum product for lubrication. Such materials have a harmful effect on the hose materials.

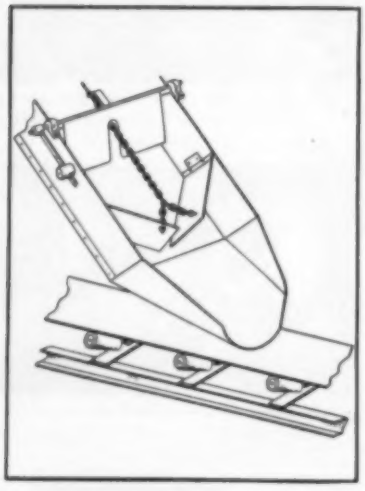
DO seal the cut end of hose with shellac or rubber cement. Sealing the end prevents absorption of water or oil into the carcass.

DON'T cut out or burn out inside of tube to accommodate a coupling shank that is too large. This practice ruins tube, causes trouble.

DO keep hose and coupling shank aligned as you press the two parts together. Put the coupling in a vise so that you can hold it securely.

DON'T twist hose or hold it at an angle to force it on oversize coupling; O. D. of coupling shank should be the same as I. D. of hose.

Chute Control Smooths Belt Loading



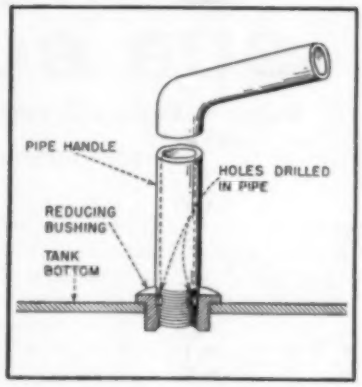
REDUCED ABRASION to the belt, better load centering and less spillage are top benefits achieved when this chute control developed by Edward Robinson, unit engineer, Bolsover colliery, Derbyshire, England, and recently described in *The Colliery Guardian*. A swinging door connected to a pair of dampers with a chain controls the flow.

The swinging door, bolted to a shaft which is fitted across the flat-bottom chute, is counter-weighted to hold it in the closed position. Through a slot cut in the center of the door passes a 5-ft length of chain which is divided into a Y at the lower end. The chain is fastened to the door by a bar and eyebolt. Two dampers, hinged on the sides of the chute and 90 deg with the bottom, are attached to the Y end of the chain. These dampers open as the swinging door is opened by the weight of the coal behind it.

A gap between the swinging door and chute bottom permits a small quantity of coal to pass at all times. The hinged dampers hold back the coal until sufficient weight is built up to open the door. When the coal is released, it has about the same velocity as the belt, and abrasion thus is reduced.

A Simple Valve . . .

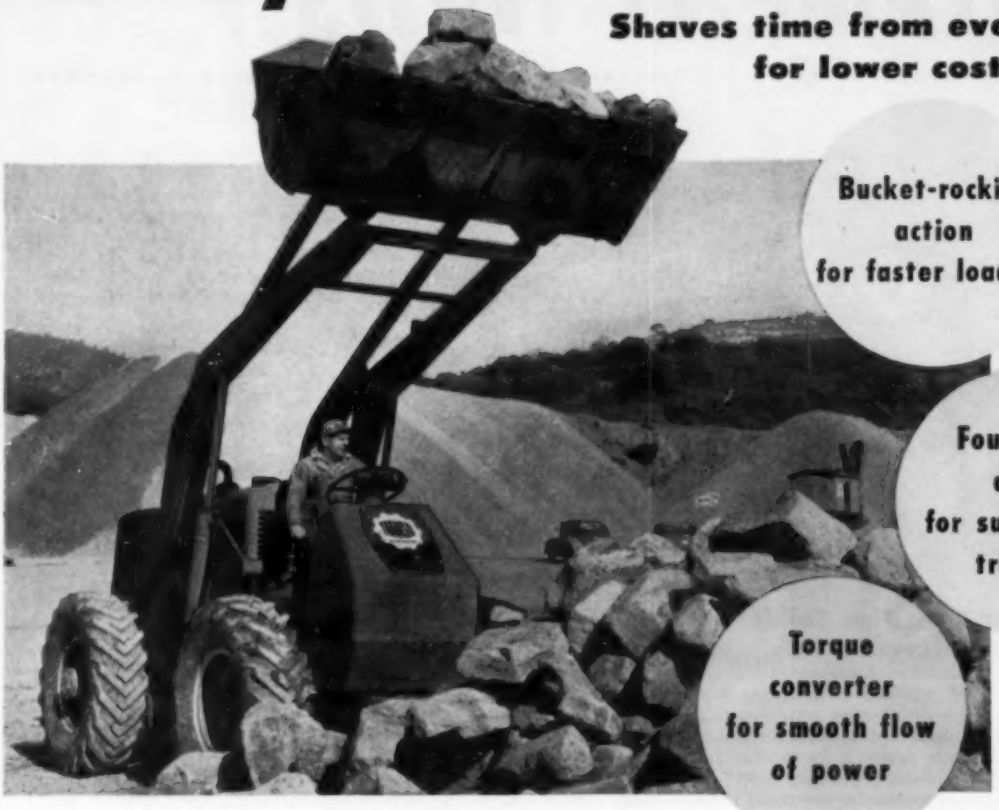
"HERE IS A DESCRIPTION of the simplest valve I know of. It can be made in any size," writes Charles Labbe, Las Vegas, Nev., in *Engineering & Mining Journal*, another McGraw-Hill publication.



The valve and handle is made of a length of bent pipe, threaded to fit into a reducing bushing. Two holes are drilled through the pipe a short distance from the threaded end as shown. When the handle is screwed into the bushing, the holes are blocked off by the walls of the bushing. When the pipe handle is unscrewed, the holes rise above the bushing and permit the liquid to drain out easily.

Always on the Double!

Shaves time from every cycle, for lower costs



Bucket-rocking action for faster loading

Four-wheel drive for sure-footed traction

Torque converter for smooth flow of power

LE ROI-TRANSO TLF-150 Front-end Loader

YES, sir, a 1½-yard Le Roi-Transo TLF-150 lets you move more load — faster — at lower cost — without tire spin or undue engine strain — in sand, mud, snow, or rocky terrain. It's engineered that way.

But that's only part of the Le Roi-Transo story. There are other important advantages.

Take maneuverability, for example. The TLF-150 has power steering, short (84") wheelbase, short over-all length, and a small turning radius — so it's easy to handle. Planetary-type, reversing transmission cuts reversing time 85%. The low carrying position of the bucket gives you especially good vision and provides an extra margin of safety.

And when it comes to maintenance, the TLF-150 is built to save you time and money. Engine, transmission, clutches, axle assembly, and torque converter are grouped compactly and are easy to get at.

There are even more reasons why a Le Roi-Transo TLF-150 more than pays its way on material-handling jobs. See for yourself — have your Le Roi-Transo distributor arrange a demonstration.

Write for latest bulletin.

Note how compact arrangement of transmission, clutches, and torque converter puts transfer case conveniently at rear, so by merely removing the rear grill you can replace transmission clutch in less than 60 min.
TRANSO
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A Subsidiary of Westinghouse Air Brake Co.
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MILWAUKEE 14, WISCONSIN TD-16
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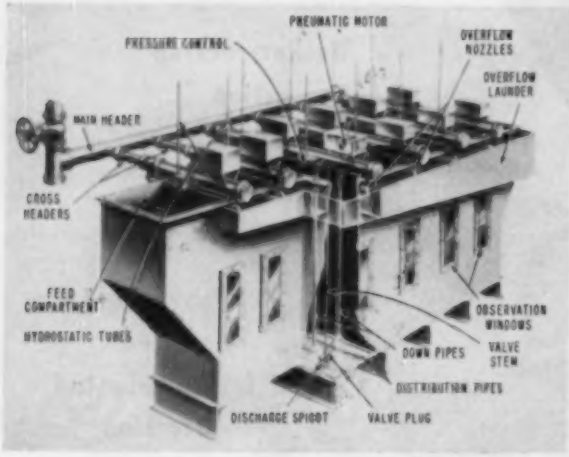
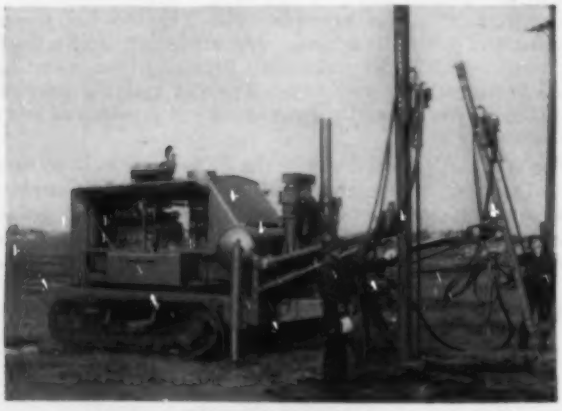
EQUIPMENT NEWS



New Classifier Sizes Fine Solids (1)

New hindered-settling hydraulic classifier, the Dorrco "Jet Sizer," continuously and automatically produces any desired number of sharply-sized fractions from minus 8-mesh feed having a wide particle-size distribution, according to the manufacturer, The Dorr Co., Stamford, Conn. The unit consists of a number of compartments designed for flexible arrangement in series or in transverse banks, depending upon feed tonnage and desired number of products. In operation, minus 8-mesh pulp is fed into the first compartment in which coarse particles are scalped out. The upward velocity of hydraulic water holds particles of a narrow size range in suspension at the bottom of the compartment, and fines overflow a submerged weir into the following compartment, where they are similarly treated at reduced hydraulic-water pressure. Thus each pocket yields a closely-sized product. Those fines not retained in the last pocket overflow to waste or further treatment, and excess water is collected in launders along both sides. Low-cost operation and simplified maintenance are major claims.

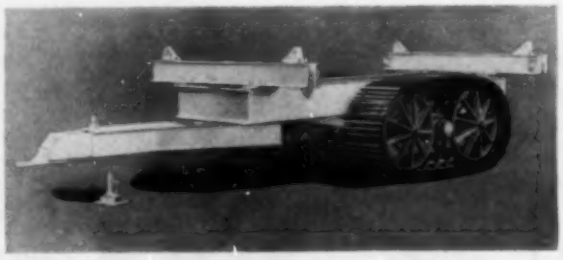


Heavy-Duty Drill Has Twin Booms (2)

Self-contained, self-propelled Drillmaster includes two hydraulic booms, two 10-ft wagon-drill towers, two X-71-WD rock drills, and a 600-cu ft "Gyro-Flo" rotary compressor. The maker claims the unit will do the equivalent work of at least three heavy-duty wagon drills in general construction and quarry work. Drillmaster weighs 28,500 lb, moves at 2 mph on the level, and will negotiate a 15% grade. Drill steel is 8 ft long, and at a single setup the unit can drill holes 18½ ft between centers. Additional information obtainable from Ingersoll-Rand Co., New York 4, N. Y., or nearest branch office.

20-Ton Truck Features Maneuverability (3)

Latest of a series of new off-highway, end-dump trucks recently announced by Dart Truck Co., Kansas City, Mo., is a 20-ton unit with a short (120-in) wheelbase making possible a 21-ft turning radius. The truck is powered by either a 225- or 275-hp diesel engine, and is equipped with hydraulic steering and either conventional transmission or torque converter. Two-stage springs, front and rear, provide easy riding loaded or unloaded, and better protection for tires and truck. The unit is offered particularly for pit work where short turns and high power are required. Other new models include the 10-ton Dart 10S and the 35-ton Dart 35SA, the latter having hydraulic air-strut front-end suspension.



New Trailer Hauls Heavy, Bulky Loads (4)

Universal Forged-Trak Trailer, available in five sizes with capacities from 6 to 30 tons, consists of a basic frame of structural steel with cross-bracing of channel and angle sections for strength in hauling heavy loads across rough terrain. The 3-position tongue is adjustable to the length of the load, and the unit may be fitted with platform, bunk or stake bodies, interchangeably. Swiveling bunks may be used in transporting loads up to 56 ft long on two trailers. The trailer is convertible into a tractor wagon by adding front running gear, either steel- or rubber-tired, depending upon right-of-way conditions. The crawler-type treads provide ground support five times that of comparable tires and offer minimum rolling resistance, thus

If you do this to a cable...

you'll want *flexible* G-E Type SH-D

When you're trying to get out the maximum tonnage each hour, cables usually take a beating. Bending, pulling, and crushing of portable cables are common causes of cable failure. To meet these conditions, use G-E Type SH-D Geoprene portable cable. With this cable you'll obtain longer cable life with consequent low replacement cost—what's more, you'll obtain easier handling and increased protection to equipment and personnel. General Electric's Type SH-D construction contains unique features of flexibility and durability which best protect this type of cable against the service abuses encountered.

Its flexibility means long life and protection to equipment and personnel

The ground wires are minutely stranded with a short lay for maximum flexibility and are approximately equal in total cross section to one main conductor. Each is encased in braid so that, when bent, the wires will slide rather than break. As a result, this cable has never, to our knowledge, had a single case of failure from broken ground wires. This flexibility and the large cross-sectional area of the ground wires reduce the hazards of faults.

The shielding is a combination cotton and copper braid which is more flexible and therefore less subject to breakage than an ordinary all-copper braid. Yet it has a copper content that gives full shielding protection against corona.

The treated jute fillers permit internal movement of the conductors to relieve strains caused by bending.

All of these features of flexibility make the cable last longer, and make it easier to handle and to move.

Its durability prolongs cable life

The strength, toughness, and resistance to fire, oil, and corrosives of Geoprene cables have been proved by many years of service. Also in G-E Geoprene Type SH-D cables the inner and outer jackets and the reinforcing corded mesh are bonded together like a reinforced tire for maximum resistance to pulling stresses, crushing, and abrasion—and for longer cable life.

For uninterrupted operation of shovels, draglines, loaders, and other heavy portable equipment, and to reduce cable replacement costs—investigate G-E Geoprene Type SH-D portable cables. General Electric has a full line of wires and cables to meet the needs of the mining industry. For more information, write Section W105-814, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

Progress Is Our Most Important Product

GENERAL ELECTRIC

permitting haulage of trains of trailers by a single tractor. Complete information available from Athey Products Corp., Chicago 38, Ill.

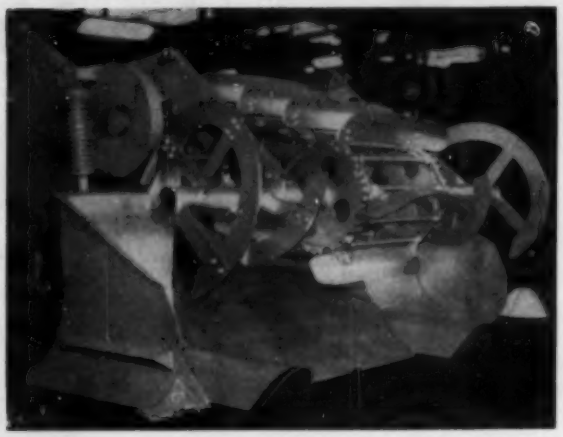
Four New Gasoline-Fueled Trucks (5)

Four new heavy-duty trucks in the International 220 series, powered by valve-in-head 201-hp engines, combine extra power with less weight, according to the manufacturer. Gross-vehicle-weight ratings range from 26,000 to 30,000 lb, the largest, the 225 Roadliner, having a combined gross weight rating of 65,000 lb. Standard transmission is 5-speed with overdrive; optional transmissions include 5-speed with direct-in-fifth or 8-speed progressive shift. Wheelbases are 142, 157, 175 or 193 in.

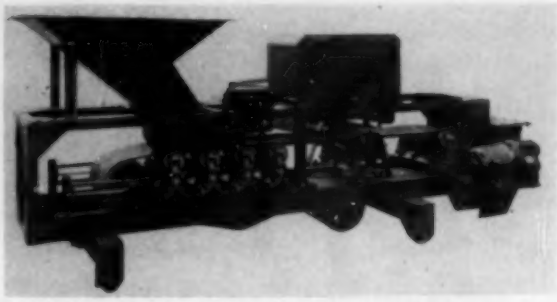
The manufacturer also announces 12 new cab-over-engine models featuring advances in load distribution and capacity, power, engine accessibility and maneuverability. Top gross combination weight rating is 65,000 lb. This new line also is powered by International's Red Diamond engine, with 4-barreled carburetor, sodium-cooled and Stellite-faced valves, and cylinder block of special close-grained alloy. Standard transmission is 5-speed with direct-in-fifth or overdrive.—International Harvester Co., Chicago 1, Ill.

Loader Converts to Track-Cleaning (6)

Athey "HiLoader" can be converted from stockpile-windrow loader into track cleaner by the addition of new moldboard which permits insertion of two tunnel hoods to clear rails. The tunnels ride over the rails as the cutting edge of the moldboard rides between and outside the rails. Hydraulic control of the moldboard insures against damage to the ties. Removing tunnels and adding flat plates to moldboard for windrow



loading requires about 10 min. HiLoader loads up to 10 cu yd per min of loose material or 25 cu yd of snow. Full details from Athey Products Corp., Chicago 38.



Portable Feed-Regulating Weigher (7)

Transportofeeder, a feed-regulating, continuous-weighing scale, may be moved to different plant locations as conditions warrant. The unit, manufactured by Dwight-Lloyd, Inc., a division of Sintering Machinery Corp., Netcong, N. J., employs completely mechanical gear differential weight integrator which continuously records on a tonnage totalizer the load passing over the feeder. Feed-regulating gate is controlled by a powered operator in response to impulses received from integrator-actuated electric switch mechanism. Feed rates may be preset within the operating range of the feeder. Units are shipped completely assembled and calibrated, and a test weight is furnished for checking accuracy after installation.

EXPLOSION-TESTED REEL (8)

Three new designs of explosion-tested, hydraulic and electric cable reels for portable mining equipment are announced by Ensign Electric & Mfg. Co., Huntington, W. Va. Smallest of the three is designed for either vertical or horizontal operation and has a continuous capacity of 100 amp. The largest, with a continuous capacity of 250 amp, will hold 400 ft of 1/0 cable.

LOW-COST AGGREGATE (9)

Dwight-Lloyd, Inc., a division of Sintering Machinery Corp., Netcong, N. J., announces a low-cost sintering process for producing high-quality lightweight aggregate from coal waste or other industrial residue. Fuel requirements are low—only 4 to 10% by weight with a totally inert raw material. A 50-ft sintering machine has a nominal capacity of 425 cu yd per day and has produced more than 600 cu yd per day. The machine may be operated continuously or intermittently in producing aggregate for lightweight or monolithic concrete, prestressed or precast structures, or for brick, tile and refractory concretes.

AUTOMATIC CHARGERS FOR LOCOMOTIVE BATTERIES (10)

A complete new line of Hobart automatic battery chargers for mine-locomo-

The FIRST loader designed specifically for Piggyback* Mining

The LONG MODEL 88 PIGLOADER

- **A low-height, heavy-duty, SINGLE-MOTOR machine capable of continuous, high capacity operation!**
- **Long wheel base with wide tracks gives unprecedented stability and positive operation even in soft bottom!**

•

PIGLOADER SPECIFICATIONS . . .

Rated Capacity: Average—3 Tons Per Minute, Maximum—5 Tons Per Minute; **Tramming Speed:** 120 Feet Per Minute; **Weight:** 14,000 Lbs.; **Electrical Enclosures:** U.S.B.M. Permissible Type; **Motor Horsepower:** A single 35 HP electric motor drives all machine operations; **Machine Control:** All functions are controlled hydraulically; **Electrical Control:** Non-reversing magnetic with start-stop pushbutton; **Conveyor Chain:** Heavy duty single strand design.

Another exclusive development by the originators of the Piggyback system of conveyor mining!

It's a proven fact that, for uninterrupted haulage from the working face, nothing even approaches the efficiency, operating economy and low capital investment of Piggyback Mining. Now—with the introduction of the Model 88 Pigloader—this unique system can be expected to offer even greater advantages.

A caterpillar-mounted machine, the Model 88 is very heavily built to withstand the hard usage of high-tonnage Piggyback mining. At the same time it is readily maneuverable and simple to operate. All functions, including raising and lowering the head and tail, are controlled hydraulically from a single bank of fingertip control valves. Further, the short length (16′), low overall height (26″) and narrow width (5′8″) of the Pigloader permits easier operation in close quarters and low coal.

If you're looking for more tons per man, higher total tonnages and lower operating costs, it will pay you to switch to low-investment, low-maintenance Piggyback Mining.

*Trade Mark

For complete details or a demonstration, write us today!

The LONG Company
OAK HILL, W. VA.
Formerly Long Super Mine Car Co.

tive batteries is available from the Motor Generator Corp., Troy, Ohio. The units are fully automatic and are available with single and multiple circuits up to 50-kw capacity. Bulletin MGC-14 with complete specifications and operating data offered by the company.

CRANE LIFTS 15 TONS (11)

New 15-B Transit Crane, a mobile crane-excavator recently announced by Bucyrus-Erie Co., S. Milwaukee, Wis., is mounted on a White-Sterling chassis powered by a 138-hp White gasoline engine. Wheelbase of the mount is 170 in. Heavy-duty 5-speed transmission mounted in unit with engine and 2-speed auxiliary in truck frame provide 10 forward speeds up to a maximum of 31 mph and two reverse speeds. Standard equipment also includes front and rear manually-controlled telescoping outriggers. Standard boom is 30 ft long, extendible to 70 ft using removable inserts; 10-ft jibs, extendible to 20 or 30 ft also available. Unit is readily convertible to ½-cu yd shovel, dragline, dragshovel or clamshell.

SQUIRREL-CAGE MOTOR (12)

More-modern appearance, greater mechanical protection and increased accessibility to mechanical and electrical parts are features of new designs for Types AB and ANY motors as a result of lengthening stator yokes to accommodate slip rings and brush rigging, and providing ample access openings for inspection and maintenance, according to a recent announcement of Allis-Chalmers Mfg. Co., Milwaukee 1, Wis. Rotor cludes Types CWO and CWS wet-pit or slip-ring leads are not exposed, and an overhung exciter mounting on synchronous machines is accomplished by using a split bracket secured to the motor end shield. Upper halves of this bracket and the end shield may be removed for access to motor windings without disturbing the exciter or bearing housing. The design is inherently dripproof and is available in splashproof enclosures. Sleeve or anti-friction bearings may be used as desired.

CONVEYOR-BELT REPAIRS (13)

"Rema," a German product, permits conveyor-belt repairs on the spot without removing the belt or using heat for vulcanization, according to the maker, Remaco, Inc., New York 7, N. Y. The repair material vulcanizes automatically through use of a chemical agent, and is available in patches and strips for edge, surface or webbing damage. No special skill is required in using the repair material.

CLOSED-CIRCUIT TV (14)

Industrial television equipment, including featherweight camera, control unit and standard receiver, is announced by Radio Corp. of America, Camden, N. J., to provide constant control and observation of industrial processes and for numerous other uses. Camera may be equipped for remote control and may be connected to feed more than one receiver. Weights are 18 lb for the control unit and 4½ lb for the camera without lens. Power required is 115-v, AC, single-phase, 60 cycles, 100 w. Full details from RCA, or circle No. 13 on the postage-free card facing p 112.

VERTICAL SHAFT PUMPS FOR ABUSIVE SERVICE (15)

Nagle Pumps, Inc., Chicago Heights, Ill., has introduced a new series of vertical-shaft pumps designed to provide a wider choice of settings, higher heads and greater design flexibility for abusive pumping applications. The series includes Types CDO and CDS dry-pit units for submerged applications, and the CDO and CDS dry-pit units for outside mounted applications. All designs are available with packed or sealed stuffing boxes at floor-plate level, and the units can be equipped with any size or shape of sump covers of structural plate. Like all Nagle pumps, the maker reports, the new models are designed for abusive service, either abrasive or corrosive, such as handling tailings, slurries, slimes or acids.

NEW TOOLS SPEED FASTENING OF CONVEYOR BELTS (16)

Fastening of wide conveyor belts can be speeded up as much as 50% with new Flexco speed tools, which also take a lot of the hard work out of joining a belt, according to the Flexible Steel Lacing Co., Chicago 44. The new Flexco power tool wrench, when used with an electric or air impact tool, greatly speeds tightening of nuts on Flexco fasteners, and can also be used with the Flexco cross arm tool with excellent results, the company reports. The new Flexco power tool boring punch, used with an impact tool, speeds boring of bolt holes with the hole in punch designed so that the slugs pop out. Use of these tools is described in Bulletin F-110, and correct impact tools are recommended in Bulletin F-111, both available from Flexible Steel Lacing.

TORQUE-CONVERTER DRIVE FOR 1-YD TRACTOR-SHOVEL (17)

Latest addition to its line of torque-converter-driven "Payloader" tractor-shovels is the Model HRC, a 4-wheel-drive unit with bucket capacity of 1 cu yd struck and 1½-yd heaped, according to the Frank G. Hough Co., Libertyville, Ill. The new model is available with either gas or diesel engine, is equipped with power steering for ease of operation and maneuverability, and also features the Hough heavy-duty full-reversing transmission providing four speed ranges in either direction. Greater production resulting from faster operation is cited by the maker for this new Payloader tractor-shovel as the result of the new torque-converter drive, and much less effort and concentration is required from the operator because of a considerable reduction in the "clutching" and gear-shifting necessary.

SPEEDY CONCRETE CLEANER (18)

Specially developed by the Rust-Oleum Corp., Evanston, Ill., to meet the problem of preparing concrete and cement floors and masonry surfaces for sealing and refinishing, the new Rust-

Electrical answers for more efficient coal preparation

From his electrical experience with three of the world's largest coal laundries, R. L. Killebrew, Westinghouse Engineer, points to lower cost operation by coordinating:

CONTROLS to centralize operation

MOTORS AND GEARMOTORS for dependable power

POWER CENTERS for economic power distribution

Our aim is to help you take maximum advantage of electric power to increase the profit possibilities in processing a chunk of coal like this. The first step calls for planning electrically to coordinate drives, control and power distribution so that only a few men are needed to maintain peak operation of the cleaning plant.

Starting at the planning stage and through equipment installation, Westinghouse has found many ways to unburden you, and your cleaning plant designer, of electrical problems. Let's take a look at the results in terms of more efficient operation.

NEXT PAGE, *how coal handling becomes more automatic.*

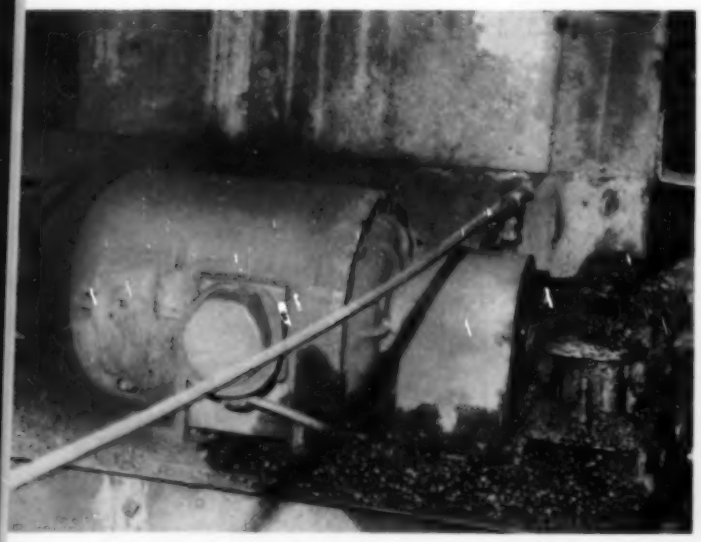
These engineers make up a team typical of Westinghouse service in depth. Consulting and application engineers coordinate equipment application. Your sales representative expedites manufacture and delivery. Field service engineers speed installation, testing, and are available for help of any kind.

Plan automatic coal handling to reduce man power, increase tonnage

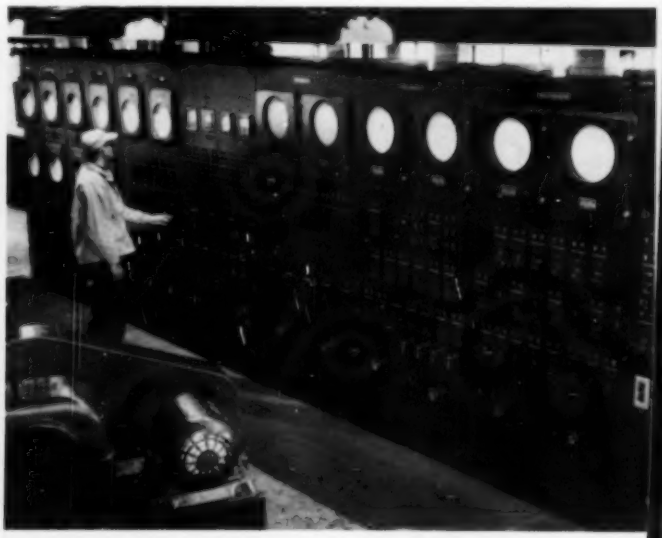
At Hanna's Georgetown Plant, Cadiz, Ohio, only 5 men, using Westinghouse Drive Equipment and Centralized Control, clean 1500 tons of coal per hour. One man loads 5 railroad cars simultaneously. Three electric eyes help weigh the loaded cars.

At J&L's Vesta Plant, Fredericktown, Pa., 2000 tons per hour of high-grade metallurgical coal are cleaned and blended for steelmaking. Coordinated Westinghouse Controls, Motors and Gearmotors power the whole operation, allowing one man to feed and unload the giant blending bins.

U. S. Steel's Robena Plant, Robena, Pa., turns out 1200 tons of coal per hour. Through the large, Westinghouse-equipped, control board, one man starts and automatically controls related conveyors and process equipment.



This Life-Line motor in TEFC enclosure can't be stopped by coatings of abrasive coal dust at J&L's Vesta Plant. The motor's sealed, pre-lubricated bearings never need greasing. Dirt can't be pumped into the bearing by frequent greasing.



Control boards, like this one at the Robena Plant, can be placed in out-of-the-way locations or in pressurized rooms. Sequence motor starting automatically starts equipment in proper order. Individual motor control is also provided.

Dependability—key to profitable automatic operation

The demands of continuous coal processing have shown the operators of these plants the value of dependable Westinghouse Drives, planned to meet operating conditions such as:

Moisture, dust and dirt are shrugged off by the 4-way sealed, pre-lubricated bearings of the new Life-Line® "A" motor. Both a labyrinth and flinger-type seal on either side of the bearing prevent entry of foreign matter or the escape of grease. Drip-proof and TEFC enclosures are available.

The Life-Line Starter is protected against dust and moisture by the right enclosures, too, as well as by the simple design of its single moving armature. The armature is balanced on a knife-edge bearing that cannot collect dust to cause sticking or jamming.

Variable loads, too, may interrupt continuous plant operation by overloading motors and circuits. Here's where the extra capacity of the Life-Line "A" motor steps in. Its new Bondar conductor insulation has high resistance to the effects of heat, built up by temporary overloads. Under severe loads, the Life-Line Starter provides dependable protection for the motor. Current is interrupted by the control's bi-metallic, disc-type relay which remains accurately calibrated during years of use.

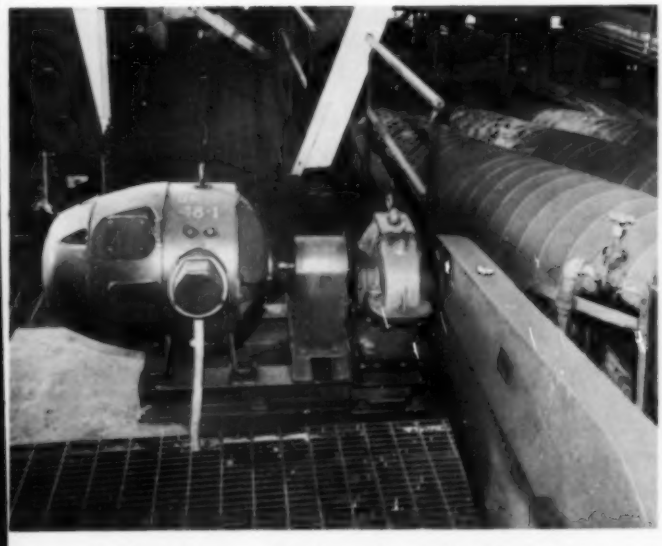
Inspection and servicing are limited on Westinghouse Geared Drives. Gearmotors and speed reducers, for instance, are designed with a horizontally split gear case. This allows access to all parts without draining oil, dismantling or disconnecting the load.

In addition, from the time your drive is installed, any one of 56 Westinghouse Field Service Offices provides immediate inspection or repair should equipment be damaged. Thirty-eight Westinghouse Manufacturing and Repair Plants are also available across the country to provide factory-type rebuilding for equipment that can be moved.

NEXT PAGE, ***how power distribution forms the framework for economy*** ▶

YOU CAN BE SURE...IF IT'S

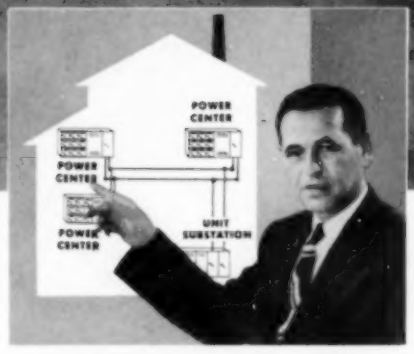
Westinghouse



A Westinghouse D-C Motor and Speed Reducer drive an Atkins medium-spiral densifier at the Robena Plant. This unit provides variable speed operation to regulate the rate at which damp coal is brought up into the chutes.

Westinghouse Gearmotors are compactly built for all types of tight-space mounting problems like this conveyor installation. Precision helical gears in the unit are BPT taper hardened to take the tough load shocks of conveyor duty.

At J&L's Vesta Plant four Westinghouse 1500-kva, 4160/480-volt, Type ASL Transformers, with associated low-voltage switchgear and capacitors, are pictured right; motor control centers are shown left.



In power system planning, Westinghouse Engineers coordinate power-center location to bring correct voltage to the load areas, improving over-all system efficiency, reliability and ease of expansion.

Economy in bringing higher voltage close to the load

Seven Westinghouse Power Centers are used to bring primary voltage into load areas at Hanna's Georgetown Plant. Only 3 kwhr per ton of coal cleaned is the average power consumption here.

Economy of the operation results largely from the advantages in bringing higher voltage close to the load. Better voltage regulation is possible so that power is available to operate each drive motor at top efficiency. Long runs of heavy secondary conduit are eliminated, too, saving considerably in the cost of copper and installation labor.

Factory assembled and tested, all 7 power centers arrived ready for installation. ASL dry-type transformers, used in each power center, provide a greater degree of safety, too. There are no liquids to store or service, or vaults to build.

* * *

A look at your future in processing coal may point to the need for electrical help. Whether you plan to increase capacity of an existing plant, or to build new facilities for this growing market, call in your local Westinghouse Representative to help in planning equipment needs. He can also supply you with the following literature, or write to Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pa.

Ask for;

New Life-Line "A" Motor	B-6154
Life-Line Gearmotors	B-5645
Westinghouse Speed Reducers	B-5646
Automatic Operations Start with Westinghouse Controls	B-5882
Complete Industrial Control	B-6051
Modern Drives for Modern Coal Mining	B-5619
Dry-type Transformers	B-5920
Control Centers	B-5621
Hi-voltage, Metal-clad Switchgear	B-5282
Preventive Maintenance	B-5477-A

YOU CAN BE SURE...IF IT'S Westinghouse

MP-3033

Oleum "Surfa-Etch" features an unusual safety factor in application. No special clothes, gloves, goggles or aprons need be worn when applying Surfa-Etch, and it is fume-free, odor-free, non-inflammable, and will not damage metal surfaces, such as, conduits or machinery, it is said. Also a time and labor saver, Surfa-Etch cleans, etches, and neutralizes the concrete or cement surface in one application by cleaning the pore free from oils, greases, dirt, etc., and neutralizing the alkalies.

MAGNET CLEANS SELF (19)

A new line of "auto-clean" spout magnets that eliminates hand cleaning and automatically removes tramp iron from the flow of material, has been announced by Stearns Magnetic, Inc., Milwaukee, Wisc. By simply opening the separator, the trap gate is automatically thrown up to block the chute, and in this position tramp iron cannot fall into the product. Powerful magnetic components swing away from the chute, permitting trapped tramp iron to fall free automatically, it is said. The unit is available in various sizes and dimensions.

JUMBO DRILL MOUNTS (20)

With the new-power swing jumbo booms, hydraulic pumps and remote-controlled drill positioner units, available from Gardner-Denver Co., Quincy, Ill., a remote-controlled drilling rig to meet specific job conditions can be designed at a mine and built onto a truck, tractor, half-track, jumbo carriage or other available chassis. Gardner-Denver power-swing jumbo booms are available in lengths up to 168 in and swing hydraulically through a horizontal arc, with hydraulic power also raising and lowering the boom through a vertical arc. Either a chain-feed or a shell-fed drill mounting may be used with the swing and dump unit, and the drill used may be a 3-, 3½- or 4-in Gardner-Denver drifter or the DH99 Gardner-Denver Deep Hole drill. In addition to remote control of the hydraulic drill position, each drill can be equipped with remote controls for regulating drilling speed, rate of feed, hole cleaning and steel extraction.

PORTABLE VENTILATOR (21)

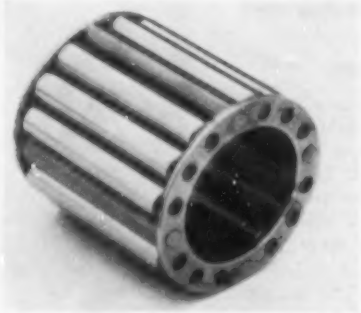
A new portable ventilator announced by Mine Safety Appliances Co., Pittsburgh 8, may be used as a blower or as an exhauster, and either with or without the accompanying collapsible air duct 15 ft long and 14 in in diameter. With its duct, the MSA portable ventilator is described by the maker as ideal for ventilating confined areas which cannot be reached satisfactorily by conventional types of stationary ventilating equipment. It is driven by a 3,450-rpm explosionproof electric motor, capable of moving approximately 3,000 cfm. Bulletin 1503-1 with details from MSA.

HYDRAULIC PULLER (22)

Armstrong-Bray & Co., Chicago 30, offers a new portable single-ram hydraulic power unit for pulling or pushing gears, wheels, bearings or parts, pulling or pushing cylinder sleeves, etc. The new "Hydragrip" unit consists of a small hand-operated hydraulic pump, connecting hose, and single ram hydraulic-actuating unit and develops, with a few strokes of the pump handle, thrusts up to 35,000 lb. The power unit has a single ram placed concentrically in the cylinder to assure accurate alignment of thrust along the center line of the puller's forcing screw, a design feature that prevents wedging, binding, power loss or scoring of cylinder walls, and reduces unit maintenance, it is said. Full details in Bulletin HY554.

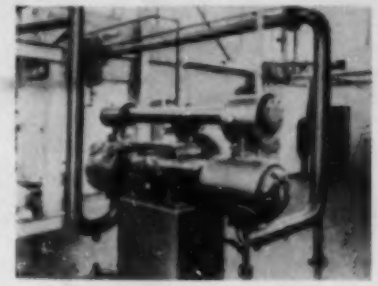
LIGHTNING ARRESTER (23)

Ohio Brass Co., Mansfield, Ohio, has announced a new valve-type Thorex lightning arrester for the protection of equipment with low impulse insulation strengths and intended for use on motors, generators, synchronous condensers, and the AC side of rotary converters as well as dry-type transformers. It has exceptionally low sparkover and IR discharge-voltage characteristics, and the porcelain-top construction permits closer spacing and reduced mounting clearance, the maker says. The Thorex RM arrester is available in 14 different line-to-ground voltage ratings from 3 to 27 kv.



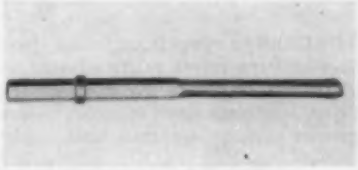
STEEL-CAGE ROLLER BEARING (24)

Designed to support heavy loads within a small area, Rollway steel-cage-type roller bearing is a self-contained unit that can be used without an inner or outer race, according to the maker, the Rollway Bearing Co., Inc., a subsidiary of Lipe-Rollway Corp., Syracuse, N. Y. The bearing shown can be used directly on a hardened shaft or sleeve, and in a hardened housing, and also can be installed directly in the bores of hardened gears or housings of extremely limited boundary dimensions and, by running directly on a hardened shaft, can support fairly heavy bearing loads, it is said. Hardened and ground steel-cage bearings of this type range in bore sizes from ⅜ to 4 in.



PACKAGED COMPRESSOR (25)

Its new PHE packaged air compressor in the 75- to 110-hp range is designed to approach the efficiency and economy of larger, more powerful slow-speed compressors, according to the Ingersoll-Rand Co., New York 4. Featuring an opposed-cylinder balanced design and driven by a direct-connected induction motor, it is a packaged, ready-to-run, heavy-duty unit arranged in single or multi stages. Basic design is a 2-stage unit for 80 to 125 psi, with other cylinder arrangements available for higher pressures or for pumping vacuums. Designed with present-day economies in mind, the PHE requires very little floor space, a simple foundation and a minimum of piping and connections, it is said. Bulletin 3155 with details from I-R.



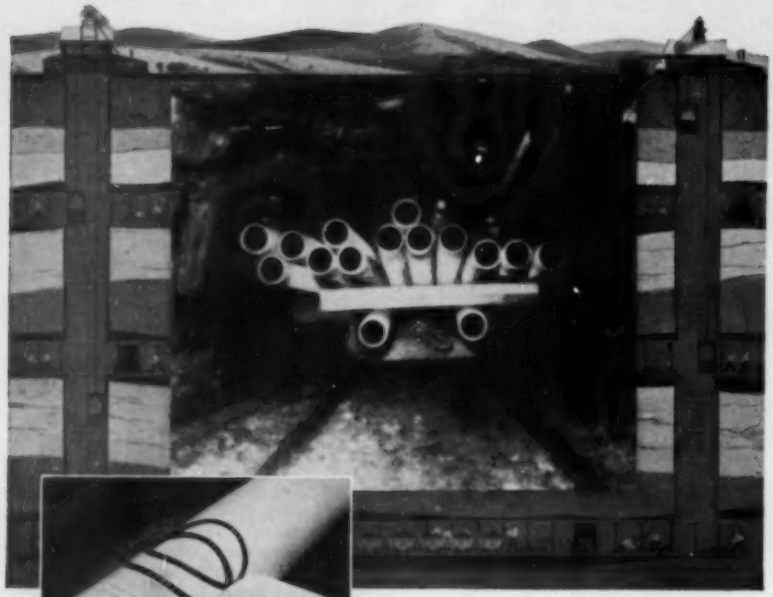
CARBIDE-INSERT BIT (26)

Brunner & Lay's carbide-inserted "Whirli-Bit" is designed to drill plug holes in stone quarries, expansion-bolt holes for setting machinery in plants, roof-bolt holes in mines, and pin holes in construction stone work, etc. It is furnished in four sizes, ¾- and ⅞-in bit size, 4- and 6-in drilling depths; other lengths and sizes available. Details from Brunner & Lay, Inc., Franklin Park, Ill.

VARIABLE-SPEED DRIVES (27)

Oilgear's new line of Type H fluid-power, constant-displacement, axial piston motors, and Falk's complete line of concentric and right-angle all-steel reducers, are combined into a new line of integral "Oilgearducers" as compact output units for Oilgear variable-speed drives. Oilgear motors, 1, 3, 8, 12 and 20 hp, are flanged- and resilient-coupling-connected to Falk single, double, triple

Now available for mine service . . .



Transite Pipe with the new Ring-Tite Coupling

Cuts installation costs through fast assembly—insures locked-in tightness

MINE OPERATORS have found that Transite® Mine Service Pipe offers many advantages in addition to its long service life. Now with the new Ring-Tite® Coupling, pipe goes together faster, assuring even greater savings in installation.

Proven Corrosion-Resistance

Over a period of many years' service, asbestos-cement Transite Pipe has proved its ability to stand up under the corrosive action of acid mine drainage water. It is light in weight and easily handled. Lines are quickly assembled, even in restricted mine passages. The new Ring-Tite Coupling forms a tight, yet flexible joint that permits deflections of up to 5° at each coupling.

Available for working pressures up to 150 lbs. per square inch and in a full range of diameter from 4 inches up, Transite is also a money-saving pipe for many other mine uses.

For complete information about the new Ring-Tite Coupling and about Transite Mine Service Pipe write for Brochure TR-51A and TR-142A, Johns-Manville, Box 60, New York 16, N. Y.

Johns-Manville
TRANSITE Mine Service Pipe

and quadruple reducers with ratio combinations providing maximum output speeds from 1.7 to 1,170 rpm, and normally continuous operation output torques ranging from 42 to 41,500 lb-in at 1,100 psi. Starting and peak torques for intermittent service can be up to 60% higher. When used with Oilgear variable-delivery pumps (input units), the maker says, Oilgearducers provide accurate speed regulation over entire range, an infinite speed range (stepless), cushioned and controlled acceleration and deceleration, quick reversal, constant torque over entire range, hydrodynamic braking; continuous service on reversing, starting, stopping and frequent speed change applications; safe operation in hazardous locations, and automatic protection against overload. Bulletin 56610 with full details from the Oilgear Co., Milwaukee 4, Wis.

BULLDOZER ROOTER (28)

A completely new model of the Esco "Dozer-Rooter," announced by the Electric Steel Foundry Co., Portland 10, Ore., now permits converting all tractors ranging from 40 to 155 hp to powerful rooters. Designed for the 40- to 70-hp range with blade heights of 26 to 37 in, the new Models 26 and 32 are heavy-duty ripping devices consisting of a tooth shank housing which mounts on the moldboard of a bulldozer by a special clamp, has four adjustments of ripping depths and is equipped with Esso box-type replaceable points. With it, the operator can rip, root and doze at the same time. Bulletin 194-A with full details from the company.

Equipment Shorts You'll Want to Check

(29) MULTIPURPOSE HOSE designed for general industrial use has been developed by the Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown 2, Ohio. Named Conductall, the new hose will conduct air, oxygen, acetylene, water, oil, grease, gasoline, kerosene and many dilute chemical and acid solutions. Republic recommends it for use on air-operated tools, for welding and cutting, spraying, and all types of water service. Available in diameters of 3/16 through 1½ in.

(30) PROTECTION FOR SPRINGS of trucks and tractors is provided by its

Available from stock in your district

FIRTHITE "Blue Bit" MINING TOOLS

Designed with sintered carbide cutting edges on both sides as well as the point to reduce tool wear, binding and power consumption.

We've made it easy for you to get the best! Now, in almost every coal mining district in the country you can get the famous "Blue Bit" carbide tipped mining tools by telephoning your nearby Austin Powder representative where all necessary grades, sizes and styles are stocked for *immediate delivery.*

These Firth Sterling "Blue Bits" have proved, time and again, that they can reduce mining costs by minimizing down time, provide maximum tool life, and outperform conventional tools in the toughest applications.

When you need carbide tools, specify Firthite "Blue Bits," the tools with the strongest braze known; when you want prompt service and delivery phone your Austin Powder representative.

R-898

Manufactured by

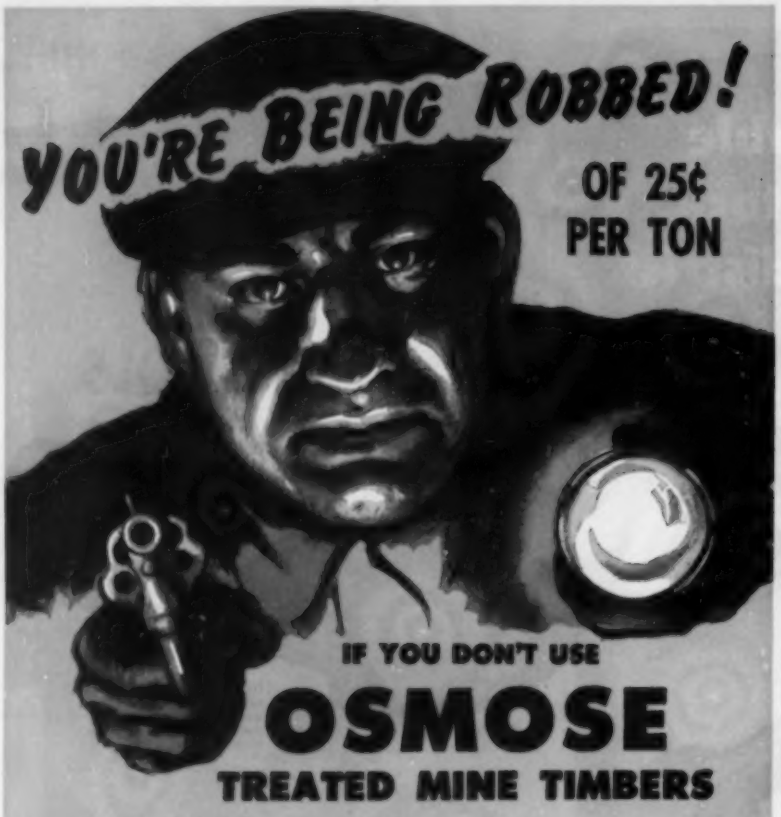
Firth Sterling INC.

Distributed by

AUSTIN POWDER COMPANY

428 Rockefeller Building
Cleveland 13, Ohio

GENERAL OFFICES: 3113 FORBES STREET, PITTSBURGH 30, PA.



If you use untreated mine timbers, *you* are being "held up," *not* the roof. You're the victim, because they are robbing you of as much as 25¢ profit on every ton you mine. 40% to 60% of your supply bill is for timber and timber replacement. We can CUT both of these costs by making mine timbers LAST LONGER.

WHY

DO THE NATION'S LEADING COAL MINING COMPANIES USE OSMOSE *Treated* TIMBERS?

Here's the report from:
ISLAND CREEK COAL CO.

"We have been using Osmose Treated Timbers in our mines since 1942 . . . We are pleased to report that we are quite well satisfied with the results."

Osmose Treated Mine Timbers are scientifically processed to resist decay and all wood destroying insects, and they last 3 to 5 times longer. With Osmose treatment ANY wood species, even beech, gum, hickory, ash, elm and maple, can be converted into *long lasting timbers!*

Write for Free Literature

and details on the type of Osmose service you prefer, (1. We sell you Treated Timbers or 2. You can buy our materials and treat your own Timbers.)

OSMOSE WOOD PRESERVING COMPANY OF AMERICA, INC.
980 ELLICOTT STREET • BUFFALO 9, N. Y.
Representatives in Pittsburgh, Denver, Birmingham, Ala., Charleston, W. Va. and Harlan, Ky.

"Guardian" leaf-spring radius arms easily installed on any make of unit, according to the Truck Equipment Co., Inc., Buffalo 14, N. Y. By transmitting the driving and braking forces directly from the axle to the frame the radius arms relieve the springs from torques and shocks that shorten spring life, protect center bolts, eliminate spring windup and improve tire mileage, it is said. Bulletin offered by company.

(31) INCREASED HORSEPOWER RATING for the TD-24, largest crawler tractor in the International industrial power and earthmoving line, now provides a rating of 190 engine horsepower and 155 drawbar horsepower, with maximum drawbar pull of 40,000 lb and operating weight for the new model of 42,884 lb. Powered by a International D-1091 diesel engine, the TD-24 is designed to work with scrapers up to 27½ cu yd, angle-blade dozers up to 14½ ft and straight-blade dozers up to 12¼ ft. Details from Industrial Power Div., International Harvester Co., Chicago 1.

(32) TRACTOR OWNERS using crawler machines on rock and other hard surfaces with resultant heavy wear, may now purchase double-grouser track shoes for Caterpillar D8 tractors. Where the tractor is working in blasted rock, track shoes suffer from extreme wear because of track slippage and also from bending which causes ultimate failure. In addition to other service features, the double grouser shoe is designed for up to 300% or more greater resistance to bending. Caterpillar Tractor Co., Peoria, Ill.

(33) WELDING HOSE—New Goodyear "Dubl-Flex" welding hose is designed to meet the demands of flexibility and handling required by welding. A molded double-line hose, consisting of a red line for acetylene and a green line for oxygen, the Dubl-Flex is produced in 3/16- and ¼-in sizes only. Goodyear Tire & Rubber Co., Akron 16, Ohio.

(34) SUPERVISORS' AID—The publisher of "Management Information" for foremen and supervisors now offers a complete program which combines a daily planning aid with a weekly supervisory development series. The new pocket-sized Elliott "Databook," issued every 2 mo, features a handy calendar and job diary combined with practical and interesting text material concisely written and planned for easy readability. It is designed to effectively reinforce the continuing objective of Management Information—"Making Good Foremen Better Foremen." Sample kit of both publications from the Elliott Service Co., Mt. Vernon, N. Y.

(35) FOR TRANSMITTING TORQUE while positively preventing reverse torque action, a new patented device called "Nobak" has been announced by the Ahlberg Bearing Co., Chicago 32. It is said to transmit torque in both clockwise and counter-clockwise rotation and can be used to lock a driven mechanism in any angular position. It is applicable to all types of vehicles, hoists, cranes and conveyors, etc., and in other equipment

New Chevrolet Trucks

deliver more power, more ruggedness, for less money!

Making sure the truck you buy has plenty of power and chassis ruggedness is good business in any man's book. Getting the money-saving extra power and ruggedness of Chevrolet trucks is *better* business in any man's book*keeping*.

EXTRA POWER MEANS BIGGER SAVINGS

No doubt about it, the extra power you get from new high-compression Chevrolet truck engines means you're going to pay out less for gasoline. Over a year, that adds up to a sizeable savings. Increased power brings time-saving benefits, too—greater acceleration and hill-climbing ability . . . you haul faster, get the job done quicker!

GREATER RUGGEDNESS CUTS OPERATING COSTS

Heavier axle shafts and wheel hubs on two-ton models; bigger, more durable clutches on light- and heavy-duty models; stronger, more rigid frames on all models. These features pay off in extra-low upkeep costs . . . extra miles of dependable truck life.

But these *while-you-drive* savings aren't all, by a long shot. You even save *when you buy*. For Chevrolet is America's lowest-priced line of trucks. Stop by your Chevrolet dealer's soon to see the "savingest" trucks on the road. He'll show you models ideally suited to your job, with facts to prove you'll get more for your money. Chevrolet Division of General Motors, Detroit 2, Mich.

CHEVROLET

MOST TRUSTWORTHY TRUCKS ON ANY JOB!

CHEVROLET ADVANCE-DESIGN TRUCK FEATURES

THREE GREAT ENGINES—The new "Jobmaster 261" engine* for extra heavy hauling. The "Thriftmaster 235" or "Loadmaster 235" for light-, medium- and heavy-duty hauling. **NEW TRUCK HYDRA-MATIC TRANSMISSION***—offered on ½-, ¾- and 1-ton models. Heavy-Duty **SYNCHRO-MESH TRANSMISSION**—for fast, smooth shifting. **DIAPHRAGM SPRING CLUTCH**—improved-action engagement. **HYPOID REAR AXLE**—for longer life on all models. **TORQUE-ACTION BRAKES**—on all wheels on light- and medium-duty models. **TWIN-ACTION REAR WHEEL BRAKES**—on heavy-duty models. **DUAL-SHOE PARKING BRAKE**—greater holding ability on heavy-duty models. **NEW RIDE CONTROL SEAT***—eliminates backrubbing. **NEW, LARGER UNIT-DESIGNED PICKUP AND PLATFORM STAKE BODIES**—give increased load space. **COMFORTMASTER CAB**—offers greater comfort, convenience and safety. **PANORAMIC WINDSHIELD**—for increased driver vision. **WIDE-BASE WHEELS**—for increased tire mileage. **BALL-GEAR STEERING**—easier, safer handling. **ADVANCE-DESIGN STYLING**—rugged, handsome appearance.

**Optional at extra cost. Ride Control Seat is available on all cabs of 1½- and 2-ton models, standard cabs only in other models. "Jobmaster 261" engine available on 2-ton models, truck Hydra-Matic transmission on ½-, ¾- and 1-ton models.*

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CONVERTED JEFFREY 29U CUTTER
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CONVERT NOW from TRACK to TRACKLESS
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These trackless advantages are yours by having your track-mounted cutters and loaders converted to trackless operation - Lee-Norse "conversions" that result in greater savings to you through . . .
• Lower investment compared with new mining machines.
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Lee-Norse Company
Specialists in Coal Mining Equipment
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Write today for complete facts on converting your track mounted equipment.

requiring positive angular positioning and protection against reverse torque. Bulletin from company.

(36) LARGE USERS OF LUMBER can easily check for possible errors in board-foot measurements as shipments are received with a new pocket-size lumber rule reading directly in board-feet. Called the Lumtape, it is said to be the first lumber-measuring device that can be carried in the pocket, instantly available at all times, and requires no time-consuming arithmetic to convert board-feet because the rule reads directly. It also has standard ⅛-in markings for other measuring work. Literature and prices from Lumtape Corp., P. O. Box 614, Hillside, N. J.

(37) LIQUID CONTROLS—New Series 67 probe fittings, designed for use in all electrically conductive liquids with standard Photoswitch level controls, eliminate the need for stuffing boxes, floats or any moving parts, the maker says. They can be used to start or stop pumps, give an alarm or perform any other control function. Several probe fittings can be mounted in the same tank to provide a variety of complex pumping operations. Bulletin PF544 with details from Photoswitch, Inc., Cambridge 42, Mass.

(38) MAINTENANCE COATING—Magic-Vulc Neoprene Maintenance Coating 245-B is a thick, paint-like liquid of high solids which may be brushed or sprayed on most surfaces, is ready to use directly from the can and requires no primer or accelerator. The dry film forms a tough, elastic adherent protective coating that is resistant to water and chemical solutions under conditions of total immersion and will adhere to metal, concrete, wood, plastic, glass and other surfaces, the maker says. In addition to protecting structures and machinery it is recommended by the company for an anti-skid coating, caulking and sealing, resurfacing conveyor belts, pulley lagging, etc. Details from Magic Chemical Co., Brockton 2, Mass.

(42) POND LINER—Designed to prevent troublesome seepage and curb water waste in man-made canals and ponds, Ruberoid's new prefabricated "Canal and Pond Liner" is a membrane saturated and coated with durable bituminous compounds, surfaced with mica on one side and sand on the other, and is said to be tough, tear-resistant and impervious to water. It is packaged in rolls 36 in by 36 ft and can be easily installed, the maker reports. Full details from the Ruberoid Co., New York 36.

(43) ELECTRIC ROCK DRILL—New Bosch electric rock drill, announced by the Homelite Corp., Port Chester, N. Y., is powered by a lightweight high-cycle motor requiring no brushes and operates from an easily carryable Homelite generator weighing 130 lb. It will drill blasting holes, wedge holes, split holes and anchor holes in the toughest rock, concrete or brickwork up to 18 ft deep, the company says. Full data from Homelite.

WILFLEY PUMPS

A Vital Factor in Production Continuity

WILFLEY'S remarkable success-record in solving a great variety of pumping problems is well known to operators of mills and chemical plants all over the world. It is a record born of engineering "know-how" plus many years of experience in keeping pace with the changing requirements of modern industry.

- *Individual engineering on every application*
- *Cost-saving efficiency*
- *Reduced power and maintenance costs*
- *Continuous operation without attention*
- *Minimum replacement of parts*
- *Designed for simple installation*
- *Economical pump size for every requirement*

Write or wire for complete details.

Wilfley Acid Pump
"COMPANIONS IN ECONOMICAL OPERATION"
Wilfley Sand Pump

Typical Wilfley installations are shown below. Rubber lining and stainless steel are some of the materials used in Wilfley Sand Pumps and Acid Pumps to provide maximum pumping efficiency.

A. R. WILFLEY & SONS, Inc. • Denver, Colorado, U.S.A. • New York Office: 1775 Broadway, New York City

12000 hours before first overhaul

Hyland Coal Co. of Locust Gap, Pa., owns three Caterpillar D8 Tractors. One D8 is a veteran of 15,000 hours. Its CAT* Diesel Engine was overhauled at 12,000 hours—and needed only a set of rings and one new piston. Transmission and final drive were not overhauled until 14,000 hours. The two other D8s have a total of almost 9000 hours between them, and the company reports no trouble with either machine.

Here's what one of the company's "Cat"-skinners says: "You don't have to advertise these tractors, do you? Everyone knows they're tops."

The D8 has stamina to work in equipment-busting material. Even in harmful abrasive dust, really effective filters and seals protect the factory-built precision of its engine and hydraulic system. The D8 is now equipped with an oil-type flywheel clutch for even longer trouble-free operation—even on jobs that are particularly rough on clutches.

Note the big, *high-profit* load on the No. 8A Bull-dozer blade in the illustration. Scientific moldboard design imparts a rolling motion, even in "dead" material. Balanced traction and easy controllability let you move a lot of material *fast*, even in tricky going.

Caterpillar track-type Tractors are built to do *more work* at *less cost* with *lower down time* and *longer work life* than *any* competitive unit. Strong statement? Yes! But we can back it up. See your Caterpillar Dealer for on-the-job *proof*. He'll help you select the tractor-bulldozer combination that's right for you. He represents the most complete line in the industry. And he backs his sales with fast, dependable service and genuine factory parts.

Caterpillar Tractor Co., Peoria, Ill., U.S.A.

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Please send me catalogs or further information about the items from the Equipment News Section whose numbers are circled. (August, 1954)

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2	7	12	17	22	27	32	37	42	47	52	57	62	67	72
3	8	13	18	23	28	33	38	43	48	53	58	63	68	73
4	9	14	19	24	29	34	39	44	49	54	59	64	69	74
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In addition, please send me data on these OTHER products advertised in this issue (give name and page number) .....

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Company .....

Address .....

NOT GOOD if mailed after Oct. 1, 1954

FREE BULLETINS AVAILABLE

(45) ROOF DRILLS—Bulletin available from the J. H. Fletcher Co., P. O. Box 353, Huntington, W. Va., describes the Fletcher roof-control drills designed as complete units to drill holes, install and tighten bolts, collect dust and carry materials. Full specifications and operating data are provided on various models available to meet varying mine conditions, either rubber-tired or track-mounted.

(46) TRACTORS, POWER MACHINERY—The complete line of International industrial power products, 73 in all, is described in a new 48-pg catalog available from the International Harvester Co., Chicago 1. Technical data has been streamlined, yet descriptive material is provided on each piece of equipment in the entire line. Covered in the catalog are seven International crawler tractors; the International 2T-75 and 2T-55 rubber-tired tractors with scrapers and the 2S-75 bottom-dump wagon; two push-loaded and two self-loaded 4-wheeled scrapers; 22 hydraulic and cable-controlled bulldozers, bullgraders and angle bulldozers; allied equipment or attachments to International crawler tractors; and 18 models of International diesel, gasoline and gas power units.

(47) CRUSHERS—Bulletin 864 offered by the Jeffrey Mfg. Co., Columbus 16, Ohio, provides full details on Jeffrey "Mud Hog" crushers, which are traveling breaker plate non-plug crushers specifically designed for reducing all types of wet, sticky materials. Included are application and operating information, dimensions, specifications and capacity data.

(48) EARTHMOVING—Booklet, "Coal Production With Caterpillar-Designed Products," shows Caterpillar scrapers, track-type tractors, bulldozers, motor graders and diesel engines in actual on-the-job-operation and discusses the use of Caterpillar equipment in both pit and opencast coal mining. Also included is an informative section entitled "Standardization Pays Off." Form D426, Caterpillar Tractor Co., Peoria, Ill.

(49) PRODUCTIVE MAINTENANCE—New 18-p Bulletin GEA-6087, entitled "Five Steps to Productive Maintenance," available from the General Electric Co., Schenectady 5, N. Y. It provides detailed information on organizing your electrical maintenance program. Steps discussed include: (1) gathering equipment data; (2) determining extent of routine maintenance; (3) establishing a routine operating control system; (4) evaluation for critical maintenance; and (5) establishing a critical maintenance program.

(50) EXCAVATOR MOVIE—Pamphlet from the Bucyrus-Erie Co., S. Milwaukee, Wis., describes the company's new 16-mm sound-color film, with information on how it may be borrowed for showing to interested groups. Entitled "These Users' Views," the film runs about 25 min and shows more than 30 different examples of materials-handling jobs with B-E ⅜- to 4-yd units.

(51) SHOVEL CONTROLS—Link-Belt Speeder Corp., Cedar Rapids, Iowa, offers a new 12-p booklet, "The Inside Story of Today's Most Advanced Shovel-Crane Control System," which discusses the efficiency and reliability of its Speed-o-Matic power hydraulic control system, said to provide a production increase up to 25% for users. With the recent LS-98, a full 1-yd machine, Link-Belt Speeder now has its complete line of ½- to 3-yd crawler, truck and wheel-mounted shovel-cranes equipped with Speed-o-Matic controls.

(52) BOLTING DUST COLLECTOR—Bulletin describes the design and operation of the Browning box-type dust collector for roof bolting, said by the maker to be a lightweight, fully portable, low-cost unit that permits drilling four holes without moving and is suitable for use with either low or high top conditions. Browning Dust Collector Co., Hampden, W. Va.

(53) SPROCKETS AND ROLLER CHAIN—Bulletin A-632 covers latest technical data and prices on all items in the newly extended Dodge Taper-Lock line which now includes sprockets and chain for sizes ranging from 40 through 160, and a pitch range from ½ through 2 in. Installation and dimension data is provided on Taper-Lock sprockets in the complete size range and on Dodge roller chains, both riveted and cottered, and roller-chain pin extractors. Dodge Mfg. Corp., Mishawaka, Ind.

(54) BLASTHOLE DRILL—Ingersoll-Rand offers a new 16-pp bulletin describing the new QM-2 Quarrymaster, which the manufacturer reports is the only machine of its kind developed as a dual-purpose blasthole drill for either rotary or percussion drilling. Pointing-up features and uses for both types of operation, the booklet lists dimensions, specifications and accessories. Form 4153, Ingersoll-Rand Co., New York 4.

(55) DRAGLINE BUCKET—A medium-weight dragline bucket said to efficiently dig and load gravel, sand, dirt and all materials normally free of stumps and boulders is described in bulletin from Page Engineering Co., Clearing Post Office, Chicago 38. Available in ⅜- to 3-yd sizes, the new Page Class RM Automatic dragline bucket is strong and wear-resistant, yet lightweight for economical loading, the maker says.

(56) ALUMINUM WELDING—The latest developments in the science of welding aluminum are described by Aluminum Co. of America, Pittsburgh 19, in the completely new 176-p book "Welding Alcoa Aluminum." Combining the knowledge of Alcoa's research laboratories with the practical experience of its process-development laboratories, the manual couples photographs and drawings with comprehensive text to illustrate all the practical methods for welding aluminum, including torch welding; arc welding, inert-gas shielded-arc welding; resistance welding; and pressure welding.

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THE EDITOR, COAL AGE
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NEW YORK 36, N. Y.

(37) **BLASTHOLE DRILL**—24-pg Bulletin 50-T-2 describing 50-T blasthole drill offers a complete description of the machine's features along with a general specifications list. A large-hole churn-type drill, the 50-T can swing heavy tool springs up to 6,000 lb and drill 9- to 12-in diameter holes. Bucyrus-Erie Co., S. Milwaukee, Wis.

(38) **BUCKET PARTS**—Replacement parts for any make or model of dragline bucket are described in Catalog 108-K, Electric Steel Foundry Co., Portland 10, Ore. In addition to full specification data, helpful information includes how to determine proper drag chain length; drag and hoist chain specifications; maintenance tips and alloy recommendations; and details of several new products, such as, the new ESCO "Spring Lock" hinge repair links for drag chains.

(39) **TRACTOR-SHOVELS**—Bulletin 272 shows many of the profitable ways Hough "Payloader" tractor-shovels are used in strip mines, at underground mines and around preparation plants and loading docks. The various sizes and types of Payloader units are pictured in actual operation, loading from pits, stripping overburden, cleaning tops of strip veins, moving equipment, loading from stockpiles, trimming stockpiles, etc. Many attachments are illustrated, and specifications of six models are included. Frank G. Hough Co., Libertyville, Ill.

(60) **WATER HOSE**—New catalog covering the Boston line of water hose and water suction hose is offered by the Boston Woven Hose & Rubber Co., P. O. Box 1071, Boston 3, Mass. Designed to aid in the selection of hose best suited for particular applications in the widest variety of industrial fields, the catalog lists specifications for each type of water hose as to size, weight, construction and recommended use.

(61) **DUST CONTROL**—Pangborn Corp., Hagerstown, Md., offers Bulletin 1210, a condensed catalog of its entire line of equipment and accessories for dust control and blast cleaning. A special index for the 24-p booklet lists all equipment and accessories by equipment, by type and by purpose.

(62) **GENERATOR SETS**—Booklet, "The Right Power for Underground Coal Mining," discusses the advantages of using Caterpillar engines and electric sets in the mines and also includes a complete detailed list of all horsepower and kilowatt ratings of all Caterpillar engines and electric sets. Form D442, Caterpillar Tractor Co., Peoria, Ill.

(63) **GRINDING WHEELS**—A new 28-p Catalog 1748 describing its reinforced resinoid line of grinding wheels is available from the Norton Co., Worcester 6, Mass. It contains typical application photographs, tables of wheel sizes, prices, operating speeds and other data, and lists various portable grinding operations together with the recommended wheel specification.

(64) **OUTLET BOXES**—Bulletin 18-74, covering a complete line of outlets, switches and utility boxes and covers, is offered by General Electric's Construction Materials Div., Bridgeport 2, Conn. It lists more than 170 different types of boxes to meet virtually every wiring installation need, and details boxes for use with armored cable, nonmetallic sheathed cable, rigid and flexible conduits and electrical metallic tubing. A selection guide gives the answer on what type of box to use for a particular job.

(65) **PUMPS**—Bulletin 247, covering Warren cradle-mounted "Compacunits," Types CLFC, CIC, CMC and CHC, includes basic design and construction features, sectional and external views, dimensions, specification and other technical information. Warren Steam Pump Co., Inc., Warren, Mass.

(66) **SHOVELOADER** — Baker - Lull Corp., Minneapolis 20, Minn., offers picture catalog on its new Model 20 "Shoveloader," a rubber-tired tractor loader with a standard bucket capacity of 12 cu ft. The catalog covers various applications and provides specifications, data and action diagrams and details on accessories.

(67) **SHOVELS**—Shield Bantam Co., Waverly, Iowa, offers Specification Bulletin TSH-301 with shovel specifications, capacities, optional shovel equipment and typical shovel applications for the Model T-35, ⅜-yd, 6-ton truck-mounted Bantam. Bulletin CSH-301 covers the Shield Bantam Model C-35 ⅜-yd crawler-mounted shovel-crane.

(68) **DIESEL MAINTENANCE**—Three engineering data sheets for those concerned with diesel-engine maintenance, available from Wall Colmonoy Corp., Detroit 3, Mich., give information on the application of Colmonoy nickel-base and iron-base hard-facing and spraywelding alloys to diesel engine valves to provide wear surfaces that resist abrasion, impact, galling and corrosion.

(69) **PROTECTIVE COATINGS**—Basic data in Carboline Bulletin 200 covers five types of vinyl coatings, with complete primer requirements for all types of surfaces, including rusty steel and old coatings. Polyclad vinyl coatings are recommended by the maker for maintenance painting, sealing over non-continuous surfaces, enveloping equipment with a continuous sheathing (temporarily or permanently), and for lining steel and concrete tanks. Carboline Co., Div. Mullins Non-Ferrous Steel Castings Corp., St. Louis 19, Mo.

(70) **SAFE SOLVENTS**—"An Approach to Solvent Safety," an address given to safety engineers, discusses the problem of finding the right solvent for the jobs that must be done and explains easy analysis and sure control by application of seven rules of measurement to solvent qualities. Using an approach that is basic to all industries, the talk is available from the John B. Moore Corp., P. O. Box 3, Nutley 10, N. J.

(71) **DC WELDERS**—Bulletin 1337, Lincoln Electric Co., Cleveland 17, offers full details on six models of Lincoln "Shield-Arc" DC welders, 200 to 600 amp.

(72) **WELDING EQUIPMENT**—Catalog 54E gives full details, including prices, on the K-G line of welding and cutting equipment, including torches and tips, adaptors, fittings, regulators, etc. K-G Equipment Co., P. O. Box 538, Allentown, Pa.

(73) **AIR - CONTROL VALVE**—Three fundamental types of air-control valves are described in Bulletin 101B available from the Ross Operating Valve Co., Detroit 3, Mich. The three basic models are the integral pilot operated, the remote controlled and the direct operated valve, which, with minor variations, can be adapted to a wide range of applications.

(74) **LIFT TRUCKS**—Bulletin 5013, Yale & Towne Mfg. Co., Philadelphia 15, describes the new G-52 series of gasoline fork lift trucks, said by the maker to be completely new in design, smaller, more powerful, more maneuverable, more efficient and versatile. They are available with pneumatic or solid tires in 2,000-, 3,000- and 4,000-lb-capacity models.

Something Extra with every Fairmont Preparation Plant

Through coordinated responsibility, Fairmont-built Preparation Plants result in "something extra" which leads to operating economy plus increased separating efficiency to meet the expanding demands of today's coal markets.

When you specify Fairmont, you are assured of . . .

- Coordinated, qualified design, engineering, fabricating and erecting services.
- Independent equipment selection best-suited to meet your specific requirements.
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When you have a preparation problem, let Fairmont assume the responsibility of providing a plant that guarantees product uniformity and over 99% separating efficiency through a wide product size range of ⅛" to 10" in any tonnage capacity.

Call a Fairmont engineer!

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DESIGNERS AND CONSTRUCTORS OF COMPLETE COAL PREPARATION PLANTS USING BOTH WET AND DRY CLEANING, CENTRIFUGAL AND THERMAL DRYING.

*Note extremely rugged conditions in this photo, showing bottom loading conveyor system in British coal mine. Inset shows roll of SCANDURA.

For **FIRE SAFETY,** Long Life and Economy —

NEW **SCANDURA**

The original P. V. C. coated conveyor **BELTING**

You want *extraordinary resistance* to wear and tear with top tonnage hauls—and you get it with SCANDURA. But even more, you want *fireproof conveyor belting* that eliminates one of the great hazards of mining—fire caused by friction when your conveyor belt slips or stalls.

LET'S LOOK AT THE RECORD!

About 12% of coal mining fires in the past several years have been attributed to conveyor-belt friction.

At the 1953 annual meeting of the Illinois Mining Institute, data was presented to show that the majority of belt fires result from stalled belts while the driving pulley continues pulling.

In the tragic Evanston, Ky. fire in which 4 men lost their lives, fire was reported to have had its origin in the friction caused when a fall stopped the belt, while the drive motor continued to operate.

This record clearly points to the great need for SCANDURA BELTING!

SCANDURA, developed by our parent company, and now being manufactured in our Charlotte, N. C. plant, has these unique features:

- *Withstands abrasions that would ruin other belts.*
- *Exceptionally tenacious in holding fasteners.*
- *Solid woven base with covers that will not strip, gouge or "dog ear".*
- *Not affected by water, dilute acids, alkalis, salt solutions, etc.*
- *Non-inflammable, mildew and rot-proof.*
- *Works in temperatures ranging from 22° below to 212° above.*
- *Can be made in widths from 1" to 42" and thicknesses from ⅛" to ⅜".*

SCANDURA has been tested and used with gratifying results in Britain since 1946. For safety and economy, it's in a class by itself. Write, wire or telephone for complete data.

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NEWS ROUND-UP

White House Sets Coal Study As Governors Ask Action

President Eisenhower July 16 named a six-man inter-departmental committee to study the bituminous industry's needs and recommend a policy in the interest of national security. Mobilization Director Arthur S. Flemming heads the group. Other members, selected from executive departments, are: S. C. Waugh, State; T. P. Pike, Defense; F. E. Wormser, Interior; Lothair Teetor, Commerce; and Rocco Siciliano, Labor.

Decision to create the commision followed a White House visit June 29 by a group of coal-industry leaders and nine members of Congress led by Sen. Sherman Cooper, Kentucky. The group told the President that the industry and areas where coal is mined are facing critical economic problems, and that neglect of the industry will threaten one of the Nation's vital defense bulwarks.

Among the possible courses of action the White House visitors suggested were the following:

In the United States—(1) Require the use of coal, where available, in government buildings and installations; (2) sponsor policies to limit freight rates on coal; (3) protect coal from excessive competition by natural gas; (4) finance cooperative research to promote the use of coal; (5) make sure that coal is considered in determining the costs of electric power wherever the goverment plays a role in producing power; (6) consider the merits of establishing regular channels of communication between the industry and the government at cabinet level.

Abroad—(1) Limit imports of residual fuel oil; (2) spur more efficient refining of Venezuelan crude oil, thus reducing the output of residual oil by that nation; (3) ask European governments to remove import restrictions that discriminate against coal from the United States; and (4) limit imports of natural gas from Canada, as provided by the Hunt bill (S. 1287).

The group also told the President that it will be "a travesty" if the coal industry is deprived of its electric-utility market as result of government-sponsored research and development in atomic energy. Industry representatives thus registered their disapproval of a recent agreement by the Atomic Energy Commission and Duquesne Light Co., Pittsburgh, Pa., to build an atom-powered steam plant on the Ohio River north of Pittsburgh.

Industry representatives attending the meeting with the President were: Roy Garson and G. S. Ward, Harlan County Coal Operators' Association; Roger Cooper, Kentucky River Coal & Land Co.; Dewey Daniels, Hazard (Ky.) National Bank; J. W. Haley, Jewell Ridge Coal Co.; S. P. Hutchinson, General Coal Co.; W. B. Jamison, Jamison Coal & Coke Co.; Harry LaViers, South East Coal Co.; Hooper Love, West Kentucky Coal Co.; J. E. Moody, Southern Coal Producers' Association; C. J. Potter, Rochester & Pittsburgh Coal Co.; J. S. Routh, Routh Coal Export Co.; R. E. Salvati and R. C. Campbell, Island Creek Coal Co.; and William Sturgill, Hazard Coal Operators' Association.

Meanwhile, at Cincinnati, some 40 to 50 major bituminous producers met July 8 and 9 to continue their informal review of the industry's situation and to hear reports from committees named at earlier meetings in Chicago and New York. The producers met in closed session and issued no statement at the close of the meeting. Speculation persisted, however, that at least one result of the meetings probably would be a series of mergers to be announced within the next year or two.

On another front, the Governors' Fuel Conference, headed by Pennsylvania Gov. John S. Fine and made up of the chief executives of other major coal-producing states, demanded July 12 that the federal government restrict imports of residual fuel oil and natural gas. The coal-state governors met twice during the 46th annual Governors' Conference, held this year at Bolton Landing, N. Y. Though their action did not spell out any exact limitation, it was understood that they hoped for a cut in residual oil imports, now running at the rate of about 136,000,000 bbl per year, by about two-thirds. The group urged Congress: (1) to revive the investigation by the Senate Committee on Interior & Insular Affairs of the Nation's fuel and energy needs, which was suspended in 1951; and (2) to create "a national fuels policy which would consider the economic impact of any proposed importation of natural gas into the United States, and take such steps as may be necessary to exclude such imports when it is demonstrated that the importation of natural gas will result in economic dislocation, unemployment or serious injury to any segment of competing fuel industries in the United States."

The governors also called for a conference of state chief executives, senators and representatives of coal-producing states to be held in Washington immediately after the 84th Congress convenes in January and for the organization of individual state fuel conferences, including representatives of coal and related industries, to carry out a grass-roots study of coal and regional problems.

Also in This Section

News Brief and Trends .....p 116
Personal Notes .....p 120
Obituaries .....p 122
Rocky Mountain Meeting ....p 124
Mine Inspectors' Meeting ....p 128
New Preparation Facilities ....p 132
Association Activities .....p 134
New Books for Coal Men .....p 138
Among the Manufacturers ....p 142
Equipment Approvals .....p 154

Opponents Aim Barrage At AEC Private Power Plant

President Eisenhower's order directing the Atomic Energy Commission to contract with private utilities for electric power to be produced at West Memphis, Ark., came under heavy fire in July from advocates of public power. Senate and House members in Washington, led by a group of Democrats fearful that the Tennessee Valley Authority is being undermined, planned to amend the Atomic Energy Act to forbid AEC contracts with private utilities.

The controversy arose when the President, late in June, directed AEC to begin negotiations with Middle South Utilities, Inc., and The Southern Co. for a $107,250,000 steam station of 600,000-kw capacity to feed power into the TVA system to supplant power now supplied by TVA to the Paducah, Ky., plant of AEC. TVA proponents charged that the order was "a step toward dismemberment of TVA" and would cost the taxpayers heavily.

Countering these charges, the Bureau of the Budget stated that the cost to the government of private power would be $3,685,000 more annually than the cost of TVA power but that adjustments for taxation of the privately owned facilities would more than offset the added costs. TVA spokesmen had estimated annual excess costs at $5,550,000.

News Briefs and Trends

Three Labor Chiefs Ask Economic Props

John L. Lewis, UMWA president; Dave Beck, president, International Brotherhood of Teamsters; and David J. McDonald, president, United Steel Workers, have written personal letters to President Eisenhower, each member of Congress and the heads of the executive departments of the government demanding that the government halt growing unemployment and the present economic decline. They warned that failure to act would be playing into the hands of international communism. The letters asked for a broad program of action to return stability to domestic and foreign trade, including such steps as repeal of the Taft-Hartley law, implementation of the Employment Act of 1946, activation of a public construction program, establishment of a national fuels policy to insure coal's strength for defense, stimulation of the steel industry, wider utilization of truck transport and reduction of taxes on low incomes.

Miners Begin Return to Work

Nearly 15,000 western Pennsylvania miners began drifting back to work July 20 following a 13-day shutdown of 23 mines, most of them captive operations. The back-to-work move started after the Nemacolin local of Buckeye Coal Co., a subsidary of Youngtown Sheet & Tube Co., voted approval of a settlement recommended by John Yablonski, personal representative of John L. Lewis. The dispute had started at Nemacolin mine and had spread rapidly.

UMWA officials, explaining that the walkouts stemmed from the layoff of 235 workers at Nemacolin, said the stoppage was unauthorized and ordered the men back to work. Pickets, however, defied the order and fanned out to close other mines.

Elsewhere, at Pennington Gap, Va., gunfire poured into a small non-union mine owned by C. W. Tomlinson as eight miners were starting into the mine July 14. No one was wounded but Mr. Tomlinson closed the mine. He said he had worked under a UMWA contract for 3 yr until he canceled it April 19 "because we just couldn't make it paying union rates."

Men at Tams No. 2 Mine Gulf Smokeless Coal Co., Complete Safety Training Course

TOP PHOTO—Lloyd Fitzgerald (standing, left), USBM, instructor; seated—A. M. Baldwin (left), miner; and B. B. Udy, M. D. Hill and Oather Rushbrook, foremen. Standing—J. B. Bowen (left), electrician; Jack Tolley, foreman; Ercel Lytton, time clerk; Wilbur Cook, lamphouse attendant; G. D. Williams, night foreman; and D. P. Hall, general foreman.

LOWER PHOTO—First row: Harold Hill (left), fireboss; Nelson Scarbro, foreman; Junior Scarbro, machineman; M. F. Dameron, foreman; and Taylor Calahan, rock foreman. Second row: S. M. Teaster (left), timberman; Russel Ham, foreman; Foncie Campbell, belt foreman; and W. M. Dobins, conveyors. Third row: B. B. Hackley (left), shotfirer; T. J. Ross, conveyors; C. E. Craven, electrician; and Joe Kish, foreman. Fourth row: Mr. Fitzgerald (left); Angelo Lore, fireboss; H. E. Lytton and W. E. Greer, foremen.

New Machines, New Goals

POLISH MINING authorities are leaning on new combines like the one pictured above, now being used in the Siemienowice mine in Upper Silesia, to lift output to 100,000,000 metric tons per year by 1955, final year of the current 6-yr plan. Production in 1953 was 90,000,000 tons. This year, 1954, the Poles expect to mine more coal than Belgium, Italy and France together.

LNC Quits Coal Mining, Citizens Seek New Start

A 100-member citizens' committee has been formed in the anthracite region's Panther Valley to aid in a proxy fight to force Lehigh Coal & Navigation Co. to reopen idle mines of its mining subsidiary, Lehigh Navigation Coal Co. On June 30, LNC, third largest producer of anthracite in the nation, abandoned mining and terminated the services of some 5,000 employees, including salaried workers.

The company will be liquidated but the parent company will continue to sell anthracite and maintain its interests in railroads and other enterprises. The decision to close down and liquidate was made June 24 at an emergency meeting of the board of managers in Philadelphia and the announcement was made by C. M. Dodson, president of the parent company.

Action by the board followed a series of setbacks marked by continuing financial losses and recent refusal of miners to continue working under terms offered by the company and urged upon them by the UMWA. The company's five-point plan, offered in May, included the requirement that miners put in a full shift of work and remain on the job even after earning the minimum day's pay. The company's offer involved no change

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Toughness is an absolute requirement for long, uninterrupted service life in mining cables that are subjected to the severest of all operating conditions. Hazacord's Hazaprene ZBF sheath is designed to provide the greatest possible mechanical protection while maintaining the flexibility required by highly mobile equipment.

Hazard's new exclusive "Hex-Tite" construction prevents twisting of the insulation within the sheath, avoiding one of the most common causes of cable failure. In the Hex-Tite construction the insulation is hexagonally shaped, affording a twist-proof grip. Reinforcing cords woven over the insulation double lock the conductors in place. And the tough, flame-resistant Hazaprene ZBF sheath completely encases the conductors and holds them tight.

Your Hazard representative can furnish you with further details on Hazard mining cables or write Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

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in the wage agreement. The miners countered with a proposal to work 20 days without pay to get the company back on its feet but they refused to accept any change in local working practices. The rebellion against the company's plan, which had the approval of five local unions, was led by the Tamaqua local, which threw a picket line around the other mines.

Later, in mid-July at the Governors' Conference at Bolton Landing, N. Y., Pennsylvania Gov. John S. Fine predicted that mining would be resumed "within a reasonable time" in the Panther Valley, possibly by leasing certain collieries to individual operators. His prediction, he said, was not based on certain knowledge but it "seems to be the logical course of events."

Big Horn to Go It Alone

Big Horn Coal Co., Sheridan, Wyo., will carry on strip mining alone, it was announced June 30. In May, 1953, the company began joint operations with Sheridan-Wyoming Coal Co, with Big Horn producing coal from strip mines and Sheridan-Wyoming selling the fuel. At the same time, Sheridan-Wyoming had closed its deep mine at Monarch, Wyo. It was reported that Sheridan-Wyoming will continue to hold its extensive coal coal reserves and will go forward with its explorations for uranium, oil and other minerals.

Spur Clean-Water Drive

A compact has been proposed that would set standards on which states could base uniform legislation against pollution of the Tennessee River in Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee and Virginia. The proposal was framed at a two-day meeting of the Interim Continuing Committee for the Tennessee Basin Water Pollution Control Compact at Asheville, N. C., July 12-13. If approved by two or more of the states, the pact would set up a commission to study water quality conditions and recommend standards. Congressional enactment of enabling legislation and ratification by the states concerned would be necessary before the agreement would become effective.

Gas Price Frozen at June Level

The Federal Power Commission July 16 orderd well-head prices of natural gas sold by independent producers for interstate distribution frozen at levels as of June 7. The order stemmed from the recent Supreme Court decision in the Phillips Petroleum Co. case and was the first step taken by FPC in assuming regulation of that segment of the natural-gas industry. The Supreme Court ruling placed an estimated 4,100 gas producers under FPC jurisdiction.

Seeks Aid for Mine Drainage

Pennsylvania Gov. John S. Fine was reported at the end of June to be seeking an interview with President Eisenhower to request federal financing of a $17,000,000 anthracite mine-drainage project. Gov. Fine is said to have the support of both U. S. senators and several representatives from Pennsylvania, in addition to that of the UMWA. The plan was recommended in May in a report submitted to the governor by the Anthracite Mine Drainage Study Commission, which pointed out that a big drainage tunnel could cut the flow of surface water into mines by 25% and reduce the industry's pumping costs by $1,125,000 per year.

Crackdown Closes 14 Mines

Fourteen mines had been closed down temporarily and 18 persons convicted of safety violations early in July in a safety crackdown by the West Virginia Department of Mines. The drive followed a warning issued in June by Mines Chief Frank B. King that a "ruthless" safety enforcement campaign would be undertaken if the safety record was not improved. Most of the violations involved improper ventilation. Operators were given from 1 to 25 days to comply with the law. Twelve of the 14 mines have been allowed to re-open following improvements ordered.

Stith Sells Properties

Stith Coal Mining Co., Walker County, Ala., has sold its properties, including machinery, equipment, land and houses, to Marc Levine Industries. The mining company, which employed 150 men, was shut down April 15 because, according to an attorney representing the purchaser, the former owners were not optimistic about the future. Marc Levine Industries plans to subdivide the land and sell the 109 houses to present occupants or others.

Old Ben to Reopen Mine

Old Ben Corp. in mid-July was reported to be installing new machinery preparatory to reopening Mine No. 14, Buckner, Ill., on or about August 1. The mine has been idle since last February and was the oldest operating mine in Franklin County when it was closed.

COAL MEN ON THE JOB . . .

L. M. Walters (left photo), general superintendent, No. 1 mine and No. 12 Alma mine, Sycamore Coal Co., Cinderella, W. Va.; and B. A. Workman, superintendent of mines, Lorado Coal Mining Co., Lorado, W. Va.

Operations will be resumed with a curtailed labor force. Total employment at the time of closing in February was over 650, with about 550 men underground.

. . . and For Your Information

Virginia Coal Operators' Association has established a $300-per-year scholarship in mining engineering at Virginia Polytechnic Institute for a male resident of Virginia.

Two residents of Columbus, Ohio, have filed suit for $820,000 against Muskingum Coal Co. alleging that the company "wrongfully" mined 40,000 tons of coal from beneath 40 acres of land adjacent to company property.

A receiver has been appointed for Wilma Coal Co., Inc., Belleville, Ill., following the filing of a voluntary petition in bankruptcy listing liabilities in excess of liquid assets. Owners of the property attributed their troubles to inability to dispose of 60,000 tons of already processed coal.

A trial examiner for the National Labor Relations Board has recommended payment of $5,299 in back wages to a discharged strip miner near Clarksburg, W. Va. Last October, a court had set aside the NLRB's finding for $5,381 and had remanded the case to the NLRB with instructions to make specific findings of fact. The recommended award represents back pay from June, 1949, to April, 1952.

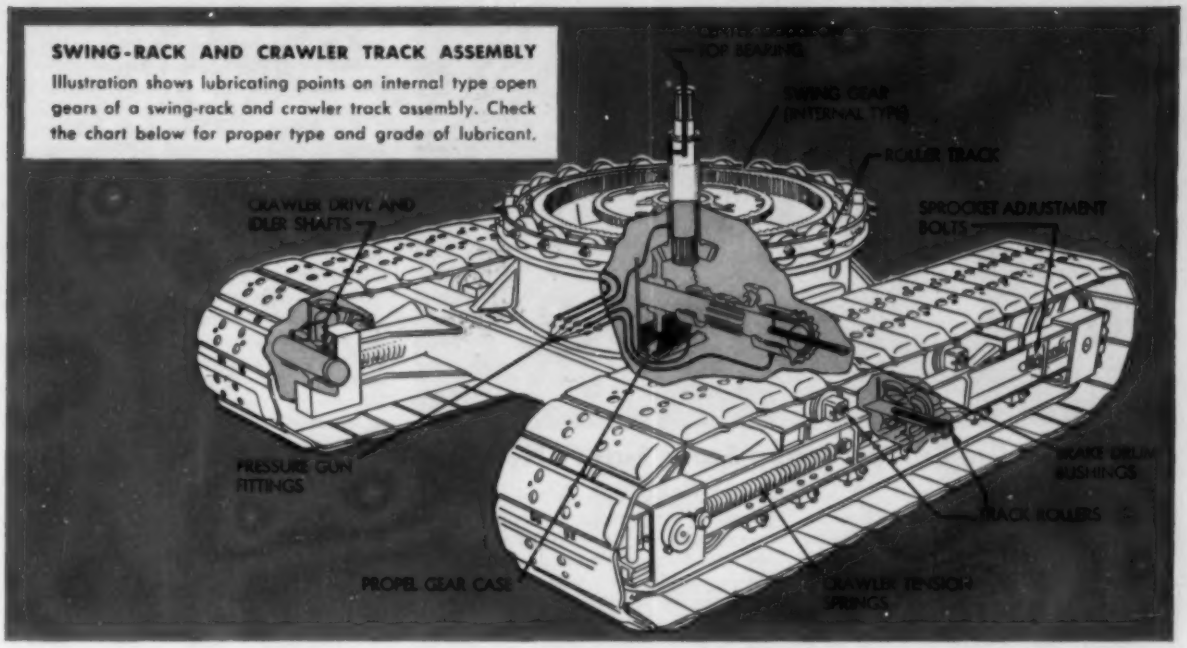
Six weeks of tight sealing has extinguished a fire that did $50,000 damage in a mine of Uniontown Coal Mining Co., near Owensboro, Ky. A short circuit ignited the fire May 9.

A $150,000 verdict against the UMWA and the Norton (Va.) local of UMWA District 28 was reversed July 16 by the Federal Circuit Court of Appeals at Abington, Va., and a new trial was ordered. Operators of the Low Gap Coal Co., had won their suit in a lower court on a charge that the UMWA had caused Clinchfield Coal Corp. to cancel a lease with Low Gap Coal Co.

The British government has authorized further imports of coarse coal to meet fuel needs in the coming winter. Though the National Union of Mineworkers assured the National Coal Board earlier in the year that a 2½% boost in output from British mines could be expected, no increase over 1953 has yet shown up, except for 1,000,000 tons attributable to there being no coronation holidays in 1954. The quantity of imports planned for 1954 was not revealed.

The first section of the world's largest oil-from-coal plant has begun operations near Johannesburg, South Africa. Other sections of the $84,000,000 project will go on the line in the next few months.

The Alberta government, recognizing the problems of the Canadian coal industry, which is facing loss of markets to competing fuels, has appropriated $400,000 to establish a research laboratory for the Alberta Research Council for investigation of new uses of coal.


SWING-RACK AND CRAWLER TRACK ASSEMBLY
Illustration shows lubricating points on internal type open gears of a swing-rack and crawler track assembly. Check the chart below for proper type and grade of lubricant.
CENTER CASTING TOP BEARING
SWING GEAR (INTERNAL TYPE)
ROLLER TRACK
CRAWLER DRIVE AND IDLER SHAFTS
SPROCKET ADJUSTMENT BOLTS
PRESSURE GUN FITTINGS
BRAKE DRUM BUSHINGS
TRACK ROLLERS
PROPEL GEAR CASE
CRAWLER TENSION SPRINGS

Where, how and with what to lubricate?

Lubricating procedures and suggested materials discussed on this page represent just one of the many invaluable sections contained in the newest Cities Service EARTH MOVING AND CONSTRUCTION MACHINERY LUBRICATION BOOK. For your FREE copy, write Cities Service Oil Company, Sixty Wall Tower, New York City 5.

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LUBRICATION OF SWING-RACK AND CRAWLER MECHANISM

Part or Unit	How Lubricated	Lubricant Recommended	Grade No. 0° F. to 32° F.	Grade No. Above 32° F.
CRAWLER MECHANISM— Track rollers, idlers, track wheels, etc.				
Oliver:	Track Wheel System	Trojan Gear Oil	#90	#140
Allis-Chalmers:	Positive Seal Units	Trojan Grease	P-0	P-0
Others—				
Grease Lubricated:	Pressure gun fittings	Trojan Grease	A-0	A-1
	Pressure gun fittings	Trojan Grease	F-3-0	F-2-0
Oil Lubricated:	Hand gun or other means	Trojan Gear Oil	#90	#90 to #250
GEAR DRIVES—				
Open: Normal Condition	By brush or other means	Cisco Compound	#3-Z	#5-Z
Dusty Condition	By brush or bath	Raven Oil	#3	#7
Enclosed:	Bath	Trojan Gear Oil	#90	#140

Benton, Ill., Rescue Group Scans Safety Needs

The Fred J. Bailey Post No. 4, National Mine Rescue Association, held its fourth meeting late in May, at Benton, Ill. Formal and informal discussions took place on a broad range of subjects, including recent fires, new safety equipment and accident statistics.

Among those attending the meeting were the following, shown in the above photograph:

Standing—C. L. South (left), secretary-treasurer of the group and USBM inspector; George Stachura, post vice president and superintendent, Chicago, Wilmington & Franklin Coal Co.; Ray Light, National Mine Service Co., who spoke on a new methane detector; L. H. Johnson, post president and safety engineer, Peabody Coal Co.; Murrell Reak, assistant director, Illinois Department of Mines & Minerals, who reviewed the safety record in Illinois; and E. E. Quenon, chief, Vincennes, Ind., branch, USBM, who spoke on recent fires in Indiana mines.

Seated—W. R. Chick (left), USBM inspector; W. H. Tomlinson, chief, Region VIII, USBM; A. D. Sisk, chief, Kentucky Department of Mines & Minerals; James Westfield, chief, Health & Safety Div., USBM; and R. J. Condra, Safety Div., UMWA.

Personal Notes

Announces Consulting Service on Harmful Mine Dusts

R. Emmet Doherty, dust-control engineer for the anthracite industry since 1946, recently opened his own offices and laboratory at 85 Second Ave., Kingston, Pa., offering general consulting services in combatting the high costs of occupational disease resulting from exposure to industrial dust. Complete facilities are available for air-borne dust surveys, microprojection counting, particle-size measurement, petrographic microscopy and the preparation of litigation testimony. Mr. Doherty's career in mineralogy began in 1932, when he became president of Rocks and Minerals Association. In 1940 he became field engineer and geologist with Dravo Corp., on the Delaware Aqueduct project; in 1942, dust-control engineer for the Glen Alden Coal Co., Wilkes-Barre, Pa., and in 1946, dust-control engineer for the anthracite industry, serving under the silicosis committee of Anthracite Institute. Mr. Doherty has presented numerous papers on dust control at meetings of national groups, such as the National Safety Council and Mine Inspectors Institute of America, and has had a number of articles published in *Coal Age* and other publications.

O. Gressens, former executive vice president, has been made president, Peabody Coal Co., succeeding **Stuyvesant Peabody,** who has become chairman of the board. **Joseph Solari,** senior vice president, and **J. G. Solari,** vice president-Secretary, have retired from the company. **H. C. McCollum,** former assistant vice president—operations, has been made acting vice president—operations, succeeding **Frank White,** who will remain with the company.

George W. Coffey, since 1945 superintendent of Summerlee mine, New River Co., Summerlee, W. Va., recently retired at his own request, and is succeeded by **J. F. McManus,** formerly general mine foreman at the company's Stanaford No. 2 mine. At Stanaford No. 2, **Ray Burgess** has been promoted from night foreman to general mine foreman, succeeding Mr. McManus; **George Coffey Jr.,** from third-shift foreman to night foreman; and **James Page** from section foreman to third-shift foreman. In other New River changes, **R. P. Nicholls,** formerly superintendent at Oakwood mine, has been appointed superintendent of salvage and equipment rehabilitation. **O. B. Collins,** formerly superintendent at Whipple mine, succeeds Mr. Nicholls at Oakwood, and **Amos Smith,** section foreman at Stanaford No. 1, becomes superintendent at Whipple. **James A. Kennedy,** outside foreman at Summerlee, also retired July 1, after 38 yr service with the company.

Vincenzo (Jinn) Copelo, coal inspector at Angle mine, Pocahontas Fuel Co., retired July 1, after 50 yr service interrupted only by 4 yr in service during World War I. Mr. Copelo, who had not missed a day's work as a result of illness or accident in his long service, started to work at Angle mine in 1904, and became a coal inspector in 1906.

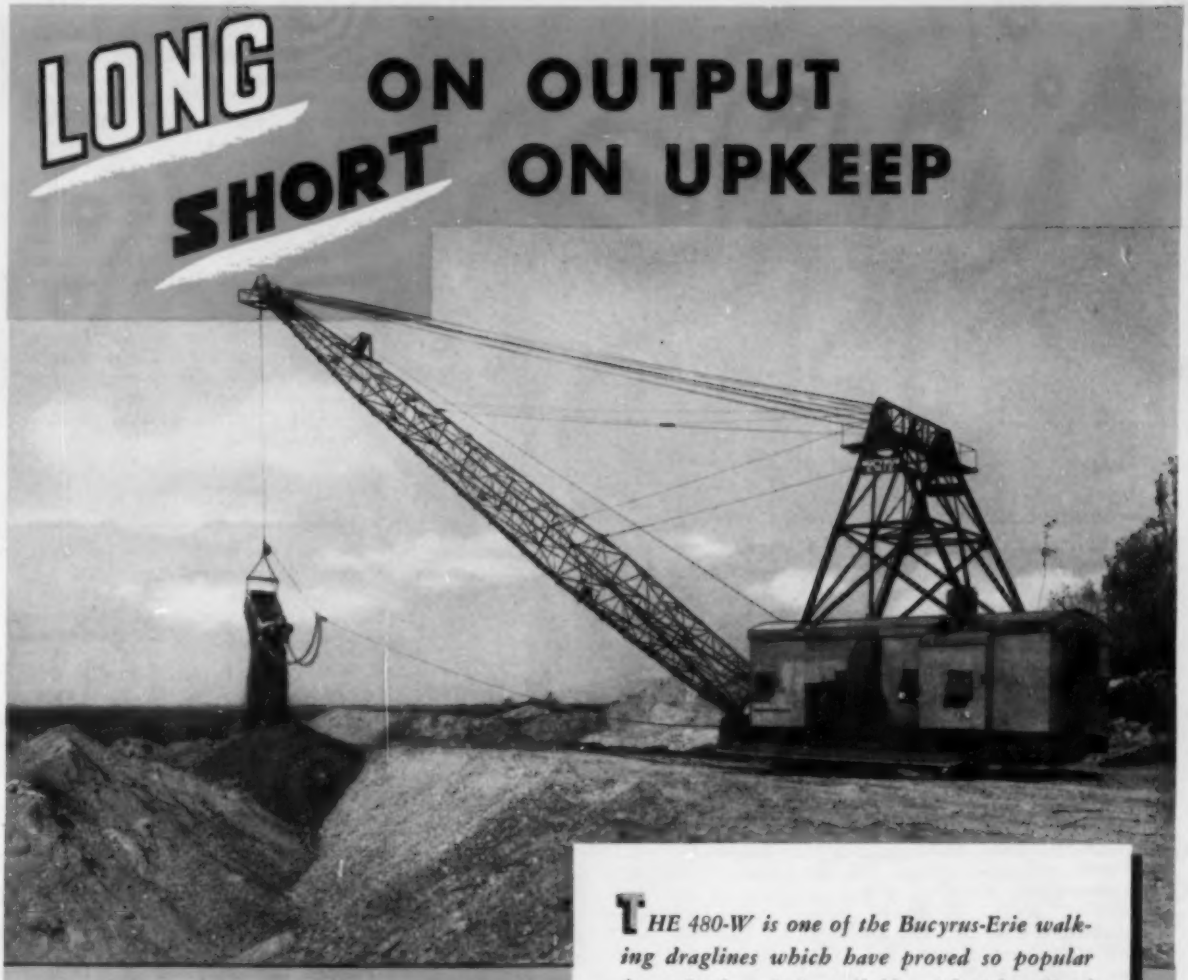
James B. Gillespie, formerly superintendent, Angle mine, Pocahontas Fuel Co., Pocahontas, Va., has been named manager of supplies, a newly created position. **Daniel C. Tabor** has been appointed superintendent at Angle mine, in addition to his present duties as superintendent, Jenkinjones mine.

George B. Clark has been named chairman, Department of Mining Engi-

Cops Old Timers' Award

CHARLES D. GIBSON, Appalachia, Va., graduating senior at the University of Kentucky, has been given the Old Timers' Award bestowed each year on the university's outstanding senior in mining engineering. Mr. Daniels, accompanied by his wife in the photograph above, was given a gold watch at the final engineering assembly program of the year, on June 18. During the year, he held a Blue Diamond Coal Co. scholarship in the College of Engineering.

LONG ON OUTPUT SHORT ON UPKEEP



THE 480-W is one of the Bucyrus-Erie walking draglines which have proved so popular for stripping. It is available with either diesel or Ward Leonard electric power, and with combinations of 175 to 215 ft. booms and 8 to 12 yd. buckets. Other Bucyrus-Erie walking draglines have bucket sizes from 4 to 30 yd. and boom lengths from 110 to 235 ft.

Long working reach, large capacity and easy, accurate move-ups are some of the characteristics that make Bucyrus-Erie walking draglines "long" on output for economical stripping.

The many users of these outstanding machines have found them equally "short" on upkeep. This reflects careful, proved engineering, and correct balance of weight, power and strength that helps hold down wear and lengthen life.

If you are interested in big-capacity, low-cost stripping, let us tell you more about features that have made Bucyrus-Eries the world's most preferred walking draglines. 6134C

South Milwaukee **BUCYRUS ERIE** Wisconsin

TOP TEAM AT LATROBE, PA.—C. M. Donahue, (second from left) vice president, Mine Safety Appliances Co., awards MSA plaque to winning team from Hutchinson mie, Westmoreland Coal Co.: John Podbesek (left), Aldren Taylor, Nick Maruschak (captain), Mike Fraicola, Andrew Gedman, Steve Halluhuri, John Deani and Earl Roberts, safety director, Westmoreland Coal Co.

Three Pennsylvania Groups Hold First-Aid Meets

Two first-aid contests held June 25 and 26 at Latrobe and Somerset Pa., respectively, resulted in perfect scores of 100% for two of the teams competing at Latrobe and in selection of 11 teams to take part in state bituminous competition at Ebensburg, Pa., September 11.

Winners and awards were as follows:

Westmoreland County Meet, Latrobe—First place, Hutchinson mine, Westmoreland Coal Co., with a score of 99.500 and award of $200 and Mines Safety Appliances Co. plaque; second place, Loyal mine, Seanor Mining Co., with score of 99.450 and award of $160 and National Coal Association plaque; third place, Jamison No. 21 mine, Jamison Coal & Coke Co., with score of 99.250 and United Mine Workers of America trophy. First- and second-place teams will compete in the state meet.

Central Pennsylvania Meet, Somerset—Tied for first place, Cardiff mine, Imperial Coal Corp., and Sonman mine, Eastern Gas & Fuel Associates, with scores of 100.00 and award of $262.50, the Cardiff mine group taking the MSA plaque by lottery; third place, Windber mine, Berwind-White Coal Mining Co., with score of 99.950 and award of $140 and UMWA plaque; fourth place, Portage mine, with score of 99.800; fifth place, Acosta-Gray Co., with score of 99.450. The three top teams will enter the State meet.

Two guest teams from operations of Jamison Coal & Coke Co. in West Virginia, as well as the team from Jamison No. 21 mine, were awarded company prizes for their scores at Latrobe.

Elsewhere, at Indiana, Pa., July 17, the Pine Township Coal Co. first-aid team, captained by Steve Stupic Jr., took first prize of $350 and Mine Safety Appliances Co. plaque for a score of 100.00%. Second-place team, headed by James Smith, was from No. 6 mine, Hiram Swank Sons, with a score of 99.700 and a prize of $280. Winner of third place was the team from Kent 2A mine, Rochester & Pittsburgh Coal Co., with a score of 99.650 and a cash prize of $210. Other teams that placed in the meet with scores high enough to admit them to state competition were: Clymer No. 2, Clearfield Bituminous Coal Corp., 99.600; Keystone mine, Imperial Keystone Coal Co., 99.550; and No. 5 mine, Pennsylvania Electric Co., 99.300. A Boy Scout first-aid team won $30.

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neering, Missouri School of Mines and Metallurgy, Rolla, Mo., succeeding **J. D. Forrester,** who recently became dean, School of Mines, University of Idaho. Prof. Clark formerly was professor of mining engineering, University of Illinois, Champaign-Urbana, Ill. **Thomas A. Read,** Columbia University, New York, N. Y., has been appointed head of the department of mining and metallurgical engineering at the University of Illinois, succeeding **H. L. Walker,** who resigned in 1953 to enter consultant's practice.

Recently appointed to the position of district inspector in the West Virginia Department of Mines, **Clayton Hampton,** MacArthur, W. Va., will be assigned mines in the Winding Gulf Division after a period of training. Mr. Hampton was last employed by Brule Smokeless Coal Co., Otsego, W. Va.

After 37 yr service with The Hudson Coal Co., Scranton, Pa., **B. T. Jones,** safety inspector, retired July 1, culminating a mining career that began in 1897 at the company's Legitt's Creek colliery and included a period as mine foreman at Marvine colliery.

John Henry Johnson, outside foreman, Page mine, Eastern Gas & Fuel Associates, recently retired with an outstanding safety record of having supervised men in his crew for 11 yr 4 mo without a lost-time accident. Mr. Johnson joined EG&FA in 1933.

F. Earle Snarr, formerly general superintendent, Chicago, Wilmington & Franklin Coal Co., Benton, Ill., has been elected vice president—operations succeeding **H. A. Treadwell,** who retired June 1.

John L. Kemmerer Jr. has become chairman of the board, The Kemmerer Coal Co., Frontier, Wyo. At the same time, announcement was made of the election of **G. E. Sorenson** as president of the company.

Obituaries

Thomas C. Mullins, 69, president, Midland Electric Coal Corp., died July 26 at Chicago. He had played a leading role in development of strip mining in Indiana and Illinois.

Harry Warren Payne, 53 general manager, American Coal Co., McComas, W. Va., died June 27 of a heart attack at Bluefield Sanatarium. One of the originators of the Bluefield Coal Show, Mr. Payne had served 39 yrs. in various capacities with the same company.

Harry Delmore Hileman, 84, died July 5 at University Hospital, Cleveland, Ohio. A consultant on working thin-seam properties, Mr. Hileman had been associated since 1900 with John M. First Co., Salineville, Ohio.

Donald C. Scott, president, J. D. Ross Stripping Corp., Cleveland, died June 24 at his home in Cleveland. Mr. Scott formed his own company in 1948, operating a mine at Lexington, Ohio.

R. Preston Richardson, 73, assistant superintendent, McAlpin Coal Co., McAlpin, W. Va., died June 30 at Beckley Hospital, Beckley, W. Va.

French Group Sets 1955 Meet

The Societe de l'Industrie Minerale will celebrate the hundredth year of its founding with a congress of mining and metal industries June 20 to July 3, 1955, at Paris. The program will include an exhibition of mines and metallurgy, visits to French industrial fields, and specialized sessions for study and discussion in the following fields: mechanical mining and loading in room-and-pillar operations and in longwalling, thick-seam mining, underground electrification, mineral-discovery problems and new ideas about the mine of the future. French, English and German will be the official languages and discussions will be held with simultaneous translations into the three languages. Further inquires may be directed to Commissariat a l'Exposition, Charbonnages de France, 9 Avenue Percier, Paris (8e).

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"We can't always control overloads on our shuttle car cable. But the damage it does has got to be stopped. It raises blisters... which makes our cable easy to tear. And you know... because of that heat the jacket on the bottom layer of cable on the reel hardens and cracks. That raises hob with cable life! What can we do?"

"You'll put a stop to the trouble if you do this..."

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ROCKY MOUTAIN OFFICERS—Fred W. Whiteside (left), secretary-treasurer; J. R. Kastler, retiring president; and C. Arthur Carlson, incoming president.

WESTERN TRENDS—J. F. Rulli (left), Sheridan-Wyoming Coal Co., Inc.; O. F. Bridwell, Northern Colorado Coals, Inc.; and B. P. Manley, Utah Coal Operators' Association.

Coal's Present and Future Main Rocky Mountain Themes

INDUSTRY MEETING — A Special COAL AGE Staff-Written Report

COAL'S PRESENT POSITION and its future prospects, particularly in the West, were the major themes of the 50th regular meeting of the Rocky Mountain Coal Mining Institute, Hotel Colorado, Glenwood Springs, Colo., June 27-30. with one session of the five devoted to mining problems and advances.

At the business sessions, the institute approved a resolution asking that the federal government make available sufficient funds independent of other government or private research agencies to develop the market for industrial coal, and chose officers for the coming year as follows:

President—C. Arthur Carlson, general manager, Knight Ideal Coal Co., Wellington, Utah, succeeding J. R. Kastler, St. Louis, Rocky Mountain & Pacific Co., Raton, N. M.

Vice Presidents: Utah—L. L. Alger, Kaiser Steel Corp.; Colorado—E. C. Horne, E. C. Horne Machinery Co., New Mexico—Andrew Gracie, St. Louis, Rocky Mountain & Pacific Co.; Wyoming, I. N. Bayless, Union Pacific Coal Co., Montana, Joe W. Fisher, Roundup Mining Co.

Executive Board: Utah—Robert D. Reeder, U. S. Bureau of Mines, and R. J. Bowen, U. S. Steel Corp.; Colorado—Lloyd W. Ingles, Colorado Fuel & Iron Corp., and W. M. Kerr Jr., Cameo Coal Co.; New Mexico—John A. Garcia, State inspector, and C. E. Osborn, Kerr-McGee Industries; Wyoming—James T. Watson, Union Pacific Coal Co., and W. T. Steinhour, Gunn-Quealy Coal Co.; Montana—Walter F. Johnson and S. H. Clarke, Roundup Mining Co.

Secretary-Treasurer, Fred W. Whiteside, consulting engineer, Denver, Colo.

Assistant to the Secretary-Treasurer—Everett E. Davis, Shubart & Schloss, Denver.

Mr. Whiteside and George R. Delamater, formerly with W. S. Tyler Co., and now retired, represented the six remaining charter members of the institute, which was organized in 1912.

Speaker of the evening at the institute dinner June 29 was L. C. Campbell, president, National Coal Association, and vice president, Eastern Gas & Fuel Associates. Noting that coal men have a common bond growing out of common problems, Mr. Campbell pointed out that the extractive industries are the basis of our standard of living. In coal particularly, today's big problem is selling even though mining problems still remain.

There has been a definite slide in business and there is definitely a change in America's fueling technique, with increased emphasis on gas, oil and electric current, which in turn means a change for coal. However, a change is no reason to fall into despair, Mr. Campbell declared. In fact there is little wrong with coal that 25 or 50c more a ton wouldn't go a long way toward curing.

We must recognize that we are in a transition period, Mr. Campbell continued, and one of the most heartening developments of this period is the way in which coal men are coming together and forgetting their differences to bring mass power to bear on the solution of the industry's problems, including unfair and subsidized competition. With help from a realistic approach to contractual relations, which Mr. Campbell observed is a necessity, with better selling, and with continued effort to keep down cost at the mines, a high degree of cooperative effort will bring about a healthy and profitable coal industry.

THE WESTERN FUTURE

The outlook for coal in the western areas was summarized by representatives of three producing areas at the opening session, with Institute President Kastler presiding, as follows:

B. P. Manley, executive secretary, Utah Coal Operators' Association, Salt Lake City, Utah—The trend in coal in the West differs little from the trend for the industry as a whole; in other words, short work weeks with reduced forces. In addition to competitive factors, warm weather in the market areas has cost western producers a substantial tonnage in late years. All these factors have culminated in market disorganization and heavy pressure on prices.

Noting that an excellent job has been done in producing and preparing coal, Mr. Manley stated that there is a real need for cooperative action on other fronts to improve the health of the industry and in stressing the need for cooperative effort pointed out that it should have the following goals in mind:

Realistic pricing action to provide a reasonable realization.

Improved merchandising and good engineering service to win and keep consumers and protect and expand markets.

O. F. Bridwell, secretary, Northern Colorado Coals, Inc., Denver, Colo.—

BUILDING COAL MARKETS WITH RESEARCH—Dr. Harold J. Rose, Bituminous Coal Research, Inc.

MINING DEVELOPMENTS—Lee Hall (left), Goodman Mfg. Co., presiding; Robert L. Hair, Colorado Fuel & Iron Corp.; T. C. Jackson, United States Fuel Co.; C. M. McConnell and K. V. Cammack, USGS; and A. F. Kain, Joy Mfg. Co.

COAL TODAY AND TOMORROW—Robert E. Lee Hall (left) and John D. Battle, NCA; A. B. Foulger, Lion Coal Corp.; A. M. Keenan, Thompson Creek Coal & Coke Co.; Tom Pickett, NCA, and Walter J. Johnson, Roundup Mining Co., panel leader.

Compared to the United States, production has declined in Colorado and New Mexico, though in contrast to New Mexico, the output has tended to level off in the past 3 yr. Warm weather in the past 3 yr, and particularly last year, has hurt, but if normal means anything, the industry can expect a pickup for this reason in the future.

Quoting from the "Economic Potential of Western Colorado," by the University of Colorado Bureau of Business Research, and the "Hill Report" on western-Colorado surface-water resources, Mr. Bridwell noted as an asset large reserves of high-rank coal, but also the fact that while the long-run future is good, the forecast for the next 10 yr is not too optimistic. Hydrogenation is a possibility, power generation will definitely take more coal, and population growth should create additional demands for energy which coal has a chance at satisfying. The two reports, Mr. Bridwell noted, predict a major development of western Colorado and, from the standpoint of power generation, Mr. Bridwell pointed out that rises in natural-gas prices may take gas out of this market where it is now a major factor.

Summing up, Mr. Bridwell observed that prospects are good for increased industrial use, and that there is some hope that modern equipment will provide real assistance in the domestic field, especially in competition against bottled gas.

J. F. Rulli, assistant to the president, Sheridan-Wyoming Coal Co., Inc., Acme, Wyo.—Reciting the history of the Sheridan field of Wyoming and how rising oil, natural gas and diesel competition had forced mine closings, consolidations and mechanization, Mr. Rulli pointed out that the end result is one mine left—and that it has gone to stripping to get the minimum cost. Developments in Montana have been much the same.

Liquefied petroleum gases have come up in late years, along with the diesel locomotive, as additional strong competitors, with the diesel taking over completely on railroads serving as Sheridan-mines outlets. At the same time, the competitive fuels have moved into the spotlight in all the region's marketing areas, and coal is thought of second if at all.

For the future, Mr. Rulli foresaw good possibilities in power generation, and a chance at the domestic market with modern equipment, particularly since the consumer has become more cost conscious. The latter may give coal an advantage over liquefied gases in rural areas where power to operate automatic coal equipment is available. It is very doubtful, however, if domestic natural-gas users can be converted back to coal in the foreseeable future.

ALLEN MINE DEVELOPMENT

Development, equipment and methods at the new Allen mine, in Stonewall Valley, 30 mi west of Trinidad, Colo.,

was discussed in an illustrated talk by Robert L. Hair, general superintendent, coal mines, Colorado Fuel & Iron Corp., Pueblo, Colo., with emphasis on safety. The Allen seam, 4 to 6 ft thick, is recovered through two slope portals, one equipped to hoist cars and the other provided with a slope belt.

All coal pitching over 10% is produced through the West Portal, with the East Portal handling production from the area under 10%. Mining will be done by shaking conveyors where the pitch exceeds 15%. Operation and equipment details include the following:

AC at 480 v for mining and DC at 275 v for haulage.

Mounted and shortwall cutters, handheld and post drills, loading machines and shuttle cars to panel belts except in pitches over 15%, where shakers are substituted.

Bridge and chain conveyors behind loaders in entries advancing up the pitch.

Roof-bolting with stopers, dust collectors and impact wrenches, using split-rod-and-wedge bolts—800 bolts per day at present.

Drop-bottom mine cars, 8 tons, and 10-ton trolley locomotives for mainline haulage.

Battery-powered tractors and trailers for delivering supplies.

Complete liquid filling of all underground tires for greater tire life.

Dual loading plants, one at each portal, for loading the coal after preliminary screening at 3 and 1½ in and reduction of the plus 3-in and 3 x 1½ to 1½ in in rotary breakers. Final cleaning is done at the Pueblo coke works.

"Safety is a major consideration at Allen mine," Mr. Hair observed. The program includes adequate clearances, careful electrical guarding, standardized roof support in accord with conditions, rock dust use at approximatcly 5 lb per ton, water piped to all working places, sprinkling during cutting and loading, 100% first-aid training of men and supervisors, Joseph A. Holmes safety chapters at all mines, and three mine-rescue teams at each mine receive refresher courses every 90 days.

THICK-SEAM MINING

How roof-bolting and reversing normal practice in development and pillar extraction in thick coal at Kingmine increased extraction and promoted safety and efficiency was detailed by T. G. Jackson, general superintendent, United States Fuel Co., Hiawatha, Utah. Coal thickness at Kingmine ranges up to 25 ft and previous mining systems were based on driving rooms in the bottom bench, then shooting down the top coal and recovering the pillars.

Inability to control the roof, even after much experimentation, resulted in relatively low extraction and increased hazard. As a result, it was decided to drive the rooms in the top bench and bolt the roof thoroughly, leaving 60 x 60-ft blocks. The next step is to slab the sides of the block to the point where a 20 x 20-ft stump is left, bolting each slab to extend protection over the entire mined-out area. Next, the bottom coal is removed, using three-drum slusher-type scrapers or conventional loading equipment. Finally the stump is shot and caved.

Ability to bolt the roof as soon as it is exposed and thus provide sure protection was cited by Mr. Jackson as the key to the plan, which contributes to safer working conditions, a higher percentage of recovery, and higher tons per man and per shift.

THE EXTENSIBLE BELT

Development of the extensible belt conveyor and its application behind continuous-mining units at two different operations was discussed by Art F. Kain, Joy Mfg. Co., Pittsburgh, Pa. The secret of the belt, which can store enough rubber for 50 ft of advance or retreat, said Mr. Kain, is the "Limber Roller," and conveyor stands can be added or removed while the unit is running without bolts or tools. Average time of insertion or removing 100 ft of belt is 5.3 min.

Design permits use of a bridge conveyor for maximum flexibility in miner advance or retreat, and to permit driven crosscuts as easily as advancing straight ahead. In one eastern Ohio mine, the extensible belt plus bridge conveyor permits mining rooms 600 ft deep, and in the initial setup output per unit was increased to 325.4 tons per shift average, six-man crews, compared to slightly over 200 tons average for shuttle cars behind the miners.

Another extensible belt, said Mr. Kain, is now in service behind a remotely controlled miner operating in a highwall. Expected advance is 1,000 ft per setup, and tons per man is expected to double.

COLORADO ANTHRACITE

Possibilities in Colorado anthracite and discussion of locations and reserves were the themes of a joint presentation by Charles M. McConnell and Kirk V. Cammack, U. S. Geological Survey, Denver, Colo. Noting that new markets are needed and that new uses can provide them, Mr. McConnell pointed out that anthracite is adaptable to many nonfuel uses, and cited the history of anthracite development in the West, which started in 1885, rose fairly steadily until oil and gas competition became strong and then dropped to 463 tons from one mine in Colorado in 1953.

Two Colorado coal areas contain coal classed as anthracite—one in the West Elk Mountain area of western Colorado and the other the Pilot Knob area of northwestern Colorado. While the seams are thick, pitch steeply and are hard to work, they could supply special markets, Mr. McConnell observed, in presenting details on the Pilot Knob and adjacent deposits. He was followed by Mr. Cammack, who detailed the locations of anthracite in the West Elk Mountain area without attempt to indicate reserves beyond an estimate of a total of 713,000,000 in Gunnison County. A firm market, he noted, would support mining ventures.

COAL TODAY AND TOMORROW

With Walter J. Johnson, president, Roundup Mining Co., Roundup, Mont., presiding, representatives of the National Coal Association and western operators discussed mining and its problems today, as follows:

Legislation, Tom Pickett, executive vice president, NCA—The makeup of Congress is one difficulty faced by the coal industry in getting favorable action or opposing unfavorable action. If all senators and congressmen from all states with some coal production supported coal's program there would be a majority. But if only the 22 states producing over ½ million tons are considered, there is no majority in either house or in important committees. Coal therefore must have help from non-coal legislators.

Pointing out that coal's record is not too good either in personal acquaintance with its senators or congressmen, or in supporting or opposing legislative programs, Mr. Pickett urged organized, cooperative effort by the industry as a means of doing an effective job by creating an active minority. The minorities, he observed—if they are active—achieve legislative action because the majorities are without convictions one way or the other and tend to follow the recommendations of the minorities.

It must also be admitted, Mr. Pickett noted, that coal is not popular in many places and then competition is more likely to be listened to. But still many people like coal, too, and this provides a favorable basis for action. The industry can be effective on the legislative front, Mr. Pickett concluded, by participating in drives when called upon, by knowing their senators and representatives, and by organizing for greater power. "Let's act in concert," and enlist the help of the friends of the industry and get them working with coal.

Past and Future, John D. Battle, assistant to the president, NCA—In the past 50 yr, "this Nation has never gone without 1 ton of coal because of the action of any coal operator." In the period 1930-53, the industry has turned out 11 billion tons of coal, or an average of 474 million tons a year. But while the production record has been formidable, profits have not kept pace and "are still very much less than they should be."

Coal has not asked for subsidy or special privilege but it does fight for fair treatment. In this connection, Mr. Battle made these points:

The federal government should cease competing with private business, such as, in power generation.

Uneconomic use of gaseous and liquid fuels should be discontinued.

To get effective action in these directions, Mr. Battle called attention to the fact that the ballot box is the final answer in getting into office men who will take action in these directions.

For the future, said Mr. Battle, power generation and the growth in manufacturing and population will require more fuel and coal will grow along with the Nation. But coal's road will not be an easy one, though "a strong coal industry is vital to a sound America and those who refuse to see this and act accord-

Continued on p 166

Exposin' a Deep Down Vein

PIONEERING FOR POWER SHOVELS. The Osborne Mining Company gets its two big power shovels into the coal stripping act fast by using an INTERNATIONAL TD-24 to rip out a working bench on the side of this Kentucky mountain.

Two INTERNATIONAL TD-24s make stripping 30 feet of overburden pay off for Osborne Mining Company

There's a 26-inch vein of utility coal heavily blanketed by 30 feet of overburden in the hills around Corbin, Kentucky, but the Osborne Mining Company works that seam at a profit by using two big red INTERNATIONAL TD-24 crawlers to help send that thick layer of overburden spilling down the mountainsides in the least possible time.

Owner C. J. Osborne tells how he gets the job done: *"The continuous working performance of my first TD-24 sold me on buying a second TD-24 a year later. The first TD-24 has run 18 months now with repairs totalling less than $300. We run into plenty of rough stuff in this operation, but nothing that 'Big Red' can't move and move fast. What's more, I've never had a roller or final drive go out, and that's something on this kind of work!"*

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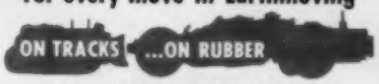


See INTERNATIONAL'S "Job-Phased" equipment

44th Mine Inspectors' Meeting

Safety aspects of underground operations, cleaning-plant practices and industry-wide problems discussed at annual meeting of Mine Inspectors Institute of America in Pittsburgh.

IMPROVING SAFETY at small coal mines, problems in roof control and dust suppression, the use of auxiliary fans with continuous-mining machines, safety aspects of underground gas storage and safety training were major themes at the 44th annual convention of the Mine Inspectors' Institute of America at Pittsburgh, Pa., June 28-30, with more than 220 institute members registered for the sessions.

At a business meeting on the final day, the group selected Springfield, Ill., as host city for the 1955 meeting and elected officers for the coming year, as follows:

President: Kenneth C. Lee, Pennsylvania Dept. of Mines, Wilkes-Barre, Pa.

First Vice President: Joseph Bierer, Mt. Storm, W. Va.

Second Vice President: J. J. Forbes, U. S. Bureau of Mines, Washington, D. C.

Third Vice President: Harry J. Dusz, Ohio Div. of Mines, Columbus, Ohio.

Secretary: C. A. McDowell, Coal Div., Jones & Laughlin Steel Corp., California, Pa.

Assistant Secretary: Robert D. Bradford, Oklahoma Dept. of Mines, McAlester, Okla.

Treasurer: Frank T. Powers, Maryland Bureau of Mines, Westernport, Md.

Editor-in-Chief: J. H. Edwards, *Coal Age*, Huntington, W. Va.

Publicity Editor: W. K. Kollak, New York Dept. of Labor, Albany, N. Y.

Life memberships in the institute were awarded to George S. McCaa and George J. Steinheiser, bituminous mine inspectors, Pennsylvania Dept. of Mines, by George H. Deike, retiring institute president and chairman of the board, Mine Safety Appliances Co., Pittsburgh.

NEW OFFICERS—President, K. C. Lee (left); vice presidents, Joseph Bierer, J. J. Forbes and H. J. Dusz; secretary, C. A. McDowell; editor-in-chief, J. H. Edwards; treasurer, F. T. Powers; and publicity editor, W. K. Kollak. R. D. Bradford, assistant secretary, is not in the photo.

CONVENTION PLANNERS—Seated: G. H. Deike (left), Mine Safety Appliances Co., and retiring institute president; and K. C. Lee, president-elect. Standing: C. F. Herbert (left), Bituminous Casualty Corp.; P. H. Schull, Illinois Dept. of Mines & Minerals; C. A. McDowell; and A. D. Sisk.

MORE SAFETY AT SMALL MINES

Leadoff speaker on the question of how to improve safety in and around small coal mines was H. J. Grafton, chief mining engineer, Eureka Casualty Co., Philadelphia, Pa., followed by formal discussions of the subject by J. R. Ruane, anthracite mine inspector, Pennsylvania Dept. of Mines, Shamokin, Pa., and A. D. Sisk, chief, Kentucky Dept. of Mines and Minerals, Lexington, Ky. Kenneth C. Lee, institute president-elect, was chairman.

In view of present economic conditions in the industry, we may be forced to revise our definition of a small mine, Mr. Grafton declared, in explaining that curtailment of operations at some mines may reduce employment to the place where such mines no longer come under the administration of the Federal Mine Safety Code. Increased mechanization of some smaller mines will have a similar effect. Furthermore, many large mines have closed and, as a result, there has been considerable sub-leasing and contracting, thus adding to the total number of small mines.

Limiting his definition of small mines to those employing from 2 to 25 men, Mr. Grafton said that to his knowledge at least one state requires inspection of all small commercial mines, but that as a general observation, small mines receive less attention from the state and federal levels than do larger operations. Unfortunately, all states do not employ a full complement of inspectors, Mr. Grafton said, and all state laws do no coincide.

Further complicating the safety picture at small mines is the fact that these operators are generally forced to hire employees who have failed to pass physical examinations for other jobs, who have other part-time employment, who desire to work only a certain number of hours or who have failed to get along

with supervision at other places, Mr. Grafton explained. And employee attitudes at small mines, where there is little or no qualified supervision, are somewhat different from those at larger operations.

Improvement of safety at small mines may be realized through training and education of the employees to develop the skills and judgment necessary to maintain the property and physical installations in a proper fashion. Good supervision, a prime necessity, may be provided if several small-mine operators in the same area would act together in hiring a competent, certified supervisor, as is sometimes done in the anthracite region, Mr. Grafton suggested.

Turning to the specific problems encountered at small mines in the anthracite region, Mr. Ruane reviewed the history of the development of "bootleg" mining, which in 1941 included about 3,000 mines employing about 10,000 men, many of whom had little or no previous mining experience. Estimates show that in the 5-yr period from 1938 through 1942, 255 men lost their lives in such operations, Mr. Ruane reported. Structures were poorly built, surveys were seldom made, underground bodies of water were an ever-present hazard and mining methods often were faulty.

Efforts to improve safety at these small mines began in 1934, when the state mining laws were amended, making it mandatory that all mines employing five or more persons be inspected and giving inspectors the right to enter all mines where two or more persons are employed, Mr. Ruane said. Progress was slow of course because of the number of small mines in existence. But in 1947, the Pennsylvania legislature enacted a small-mine act, empowering the secretary of mines to set up rules which inspectors would enforce to improve safety at the small properties.

In reporting results of these first steps, Mr Ruane noted that the fatality rate for the 9 yr prior to passage of the act was 5.44 fatalities per million man-hr. and for the 7 yr following passage the rate is 2.55. While this still is too high, Mr. Ruane declared, it is indicative of the improvement that has been made.

Further improvement can be realized through better supervision, accurate surveying, well-built mine structures and diligent training of employees, Mr. Ruane concluded.

Mr. Sisk, in his discussion, suggested that safety may be improved at small mines by:

1. Monthly inspections.
2. Improved educational facilities.
3. Permitting certification by district inspectors of qualified persons to supervise small mines, with the same penalties in force as applying to regularly certified supervisors.
4. Promoting better co-operation on

SMALL-MINE SAFETY AND TRAINING—H. J. Grafton (left), Eureka Casualty Co.; J. H. Mosgrove, Big Sandy-Elkhorn Coal Operators' Association; J. H. Ruane, Pa. Dept. of Mines; A. D. Sisk, Ky. Dept. of Mines & Minerals; F. B. King, W. Va. Dept. of mines; and Dr. B. von H. Gilmer, Carnegie Tech.

VENTILATION AND ROOF CONTROL—T. G. Fear (left), Clinchfield Coal Corp.; J. E. Elkin, Duquesne Light Co.; I. A. Stachura, Enoco Collieries, Inc.; Murrell Reak, Ill. Dept. of Mines & Minerals; F. S. Houck, W. Va. Dept. of Mines; and W. R. Cunningham, Pa. Dept. of Mines.

DUST CONTROL AND GAS STORAGE—G. R. Higinbotham (left), Consolidation Coal Co. (W. Va.); John Nagy, U. S. Bureau of Mines; W. B. Jamison, Jamison Coal & Coke Co.; W. E. Bearce, Hanna Coal Co.; W. S. McAleer, McNally Pittsburg Corp.; and H. J. Dusz, Ohio Div. of Mines.

safety matters among employees of the smaller mines.

In pointing out that in times of national emergency we may have to rely on small mines for much of the coal that would be needed, Mr. Sisk declared that he chooses to look upon their problems sympathetically and to give them all possible assistance. Improvement has been achieved in Kentucky through the combined effect of closing mines that do not meet minimum standards and the enactment of a new and up-to-date mine law.

Thomas Allen, chief inspector, coal-mine inspection div., Colorado Dept. of Mines, suggested that even though a mine may be too small to warrant a full-time certified supervisor, it is feasible to require that it employ a certified shotfirer. Legal prosecution for infractions of mining laws also is effective, Mr. Allen pointed out.

TRAINING FOR SAFETY

"Assuming that the resistance of the worker himself is a big roadblock to training, then it is our duty to get him to accept the idea," J. H. Mosgrove, safety director, Big Sandy-Elkhorn Operators' Association, Pikesville, Ky., said in explaining that "selling" safety may not be the best approach since most people throw up some resistance to sales talk. Management has not always created a favorable atmosphere for successful safety performance, Mr. Mosgrove continued, for when a foreman fails to enforce safety rules, or gambles on "fairly good" roof or a "little bit" of gas, he weakens his company's safety program at the point where it should be strongest. Co-operation among all agencies—labor, management and government—is vital, and many indicators point to the healthy development of this co-operation.

The interest in mining-vocational training for high school students is a step in the right direction also, Mr. Mosgrove said, and there is need for a course that can be taught by section foremen, safety committeemen and other local supervisors. This would permit a maximum number of men to be reached, and might insure maximum interest.

In discussing Mr. Mosgrove's paper, Frank B. King, chief, West Virginia Dept. of Mines, Charleston, W. Va., pointed out that mining laws in many states need to be rewritten. The old laws were enacted before the days of intensive mechanization, and right now some dangerous situations are not covered by state mining laws.

Promoting safety through training requires money, of course, Mr. King said, but it also takes enthusiasm, know-how and the co-operation of all concerned.

SAFETY AND PEOPLE

Development of proper attitudes among workers is just as important in promoting safety as control of environmental factors, was the thesis of Dr. B. von Haller Gilmer, professor of psychology, Carnegie Institute of Technology, Pittsburgh, in his presentation of the final paper Monday afternoon. In many instances, accident curves for a given operation are not increasing, nor are they decreasing. But they may have leveled off too far above the base, Dr. Gilmer declared. This can be expected when environmental hazards are reasonably controlled. Further improvement then requires intensive study of human attitudes bearing upon safety performance. Behavior and attitudes can be improved and there is no such thing as an "inevitable" accident, Dr. Gilmer declared.

In studies at Carnegie Tech during the past 3 yr, psychologists have made considerable progress in identifying certain personality variables related not only to the "accident-prone" individual, but to the "safety-prone" person as well, Dr. Gilmer reported, in pointing out that these studies lend encouragement to the belief that progress can and is being made in the human aspects of accident prevention. We do know a great deal about human behavior, but we need to know more, Dr. Gilmer concluded, in making the point that less than 1% of all research funds in the country is spent on the study of people.

Ventilation and roof-control were themes of the Wednesday-morning session, with Joseph Bierer, vice-president-elect, in the chair. Speakers were J. E. Elkin, general superintendent, coal dept., Duquesne Light Co., Pittsburgh; J. A. Stachura, general superintendent, Enoco Collieries, Inc., Vincennes, Ind.; Murrell Reak, assistant director, Illinois Dept. of Mines & Minerals, Springfield, Ill.; Floyd S. Houck, roof-bolt inspector, West Virginia Dept. of Mines, Mullens, W. Va.; W. Roy Cunningham, mine inspector, Pennsylvania Dept. of Mines, Johnstown, Pa., and T. G. Fear, consulting engineer, Clinchfield Coal Corp., Dante, Va.

ROOF SUPPORT AND AIR WITH CONTINUOUS MINING

Roof-bolting drills attached to continuous-mining machines at Warwick mine, Duquesne Light Co., are effectively installing roof support entirely in step with the continuous-mining cycle, Mr. Elkin explained. Bolts are installed in 2½ min at each 18-in advance of the mining machine. A full description of these methods appears in *Coal Age*, April, 1954.

A further development, reported by Mr. Elkins, is the successful application of a 3-ft auxiliary exhaust fan to achieve improved ventilation at continuous-miner faces. Line curtains alone proved to be ineffective, but the new fan, operated with the approval of the Pennsylvania Dept. of Mines and the Bureau of Mines, moves from 4,000 to 4,500 cfm through 200 to 280 ft of 2-ft tubing at about 2.5 in. w-g.

The skid-mounted fan-and-motor assembly is installed in the last open crosscut. A check brattice is constructed around the fan in such a manner that the motor and controls are on the intake side of the check and the exhaust is on the return side. A by-pass flap is built into the check to permit free flow of excess air in the section, above the requirements of the fan. The flap is operated by the pressure differential across the check, Mr. Elkins explained. The benefits are good ventilation at the face, improved dust control and better clearances in the absence of line curtains.

"After 7 mo experience with Colmols, we find that ventilating areas that do not produce much methane can be handled as in conventional mining, that is, with little or no curtain," Mr. Stachura said, in describing operations in the Indiana No 5 seam at Enoco mine. However, areas producing more methane require closer supervision, Mr. Stachura continued, although the problems might possibly be solved through the use of some type of booster fan to supplement line curtains. Even with a good line curtain one can have a low reading in the return and still be able to detect 1% or more methane at the head of the machine, Mr. Stachura said. Precautionary steps at Enoco include the use of collecting tubes extending from the cutting head back to a safety lamp at the operator's station and plans for installing continuous methane alarms on the machines. The operators are trained to stop and clear the working faces when a concentration of 2% shows up at their lamps. The continuous recorders are designed to flash a red lamp when the methane content reaches 1%.

Roof conditions at Enoco vary considerably, with a good black slate and limestone roof over the east side of the mine and a soft brown or gray shale in the southwest sections. The latter is extremely difficult to hold on conventional timbers. In development, the continuous-mining machine is advanced 25 ft in one pass and 50 ft in the adjacent one, Mr. Stachura explained. The first 25 ft is supported on props or steel jacks installed on 5-ft centers, then the Colmol is trammed to the next working place. The roof then is immediately supported by ¾-in 4-ft-long expansion-type bolts on 4-ft centers, right up to the solid coal.

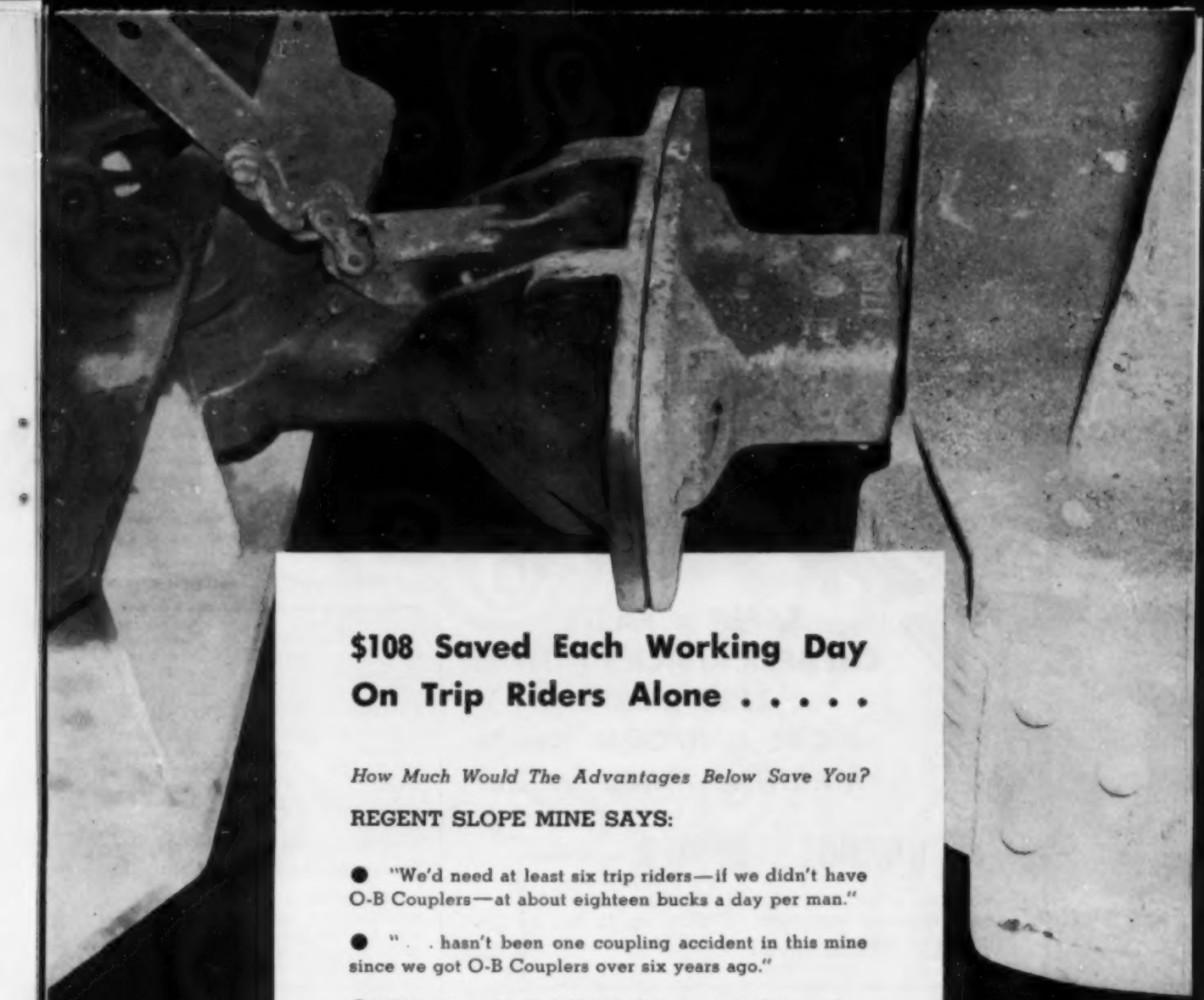
Until recently Enoco mine was pressure ventilated, but with the change to continuous mining and with pillar-recovery plans in the offing a change to exhaust ventilation was made, Mr. Stachura said.

In discussing the foregoing papers, Mr. Reak pointed out that much has been learned in the short time since continuous mining and roof bolting were introduced into the coal industry, and commended personnel at Warwick mine where nearly ¾ million tons of coal has been mined in bolted areas without a lost-time accident. In a series of questions addressed to Messrs. Elkin and Stachura, Mr. Reak brought out the explanation that rock-dusting at Warwick must be done by face crews in the final 15 min of each shift since the mine operates three shifts. And at Enoco, the Colmol operator sets his safety lamp into a receptacle on the machine which is equipped with a hood to feed air from the pick-up tube into the baffle-ring section of the lamp.

ROOF CONTROL AT THE FACE

"In 1953 there were 73 fatalities from roof falls in West Virginia, but not one of these fatalities could be traced to failure of roof bolts," Mr. Houck reported, in citing the fact that in 1953, 63% of

Continued on p 156



$108 Saved Each Working Day On Trip Riders Alone . . . . .

How Much Would The Advantages Below Save You?

REGENT SLOPE MINE SAYS:

- "We'd need at least six trip riders—if we didn't have O-B Couplers—at about eighteen bucks a day per man."
- ". . . hasn't been one coupling accident in this mine since we got O-B Couplers over six years ago."
- "Maintenance of O-B Couplers is several times less than that of any other type of coupling I've ever had experience with."
- "We don't have any runaway cars or broken trips."
- "We save valuable time the way O-B Couplers automatically couple on contact. No hands needed."

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Roof Bolt Shells and Plugs • Rail Bonds • Automatic Couplers

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SAFER • FASTER
CHEAPER • PACKS TIGHTER
LESS DUSTY
MORE UNIFORM WHEN
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BONNOT TERRIER

Capacity 2500 to 12,000 lineal feet per 8 hour day—or equivalent in sizes up to 6 inches or more.

Over 1,000,000 feet of stemming made daily on Bonnot Machines

- In some localities, a **central stemming plant** serves largest needs of several mines
- Mines usually **have suitable plastic earth** for economical machine-making
- Machine-made clay stemming **retains useful characteristics for days** with no more than ordinary care—**eliminates cost and bother** of paper-wrapped rock dust
- MEET ALL LEGAL REQUIREMENTS WHEN PROPERLY USED

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Manufacturers of Equipment for Chemical • Steel • Ceramics • Hydraulics • Materials Handling Industries

COAL MEN ON THE JOB . . .

Roy Houck (left photo), master mechanic, Tiger Mine, Hume-Sinclair Coal Mining Co., Hume, Mo.; and Harold Gaither, production manager, Cedar Creek Coal Co., Red Oak, Okla.

Preparation Facilities

Minersville Coal Co., Minersville, Pa.—Contract closed with Wilmot Engineering Co. for a Wilmot heavy-density system to prepare R-O-M coal, 2 7/16 x 3/16, at feed rate of 100 tph.

Westmoreland Coal Co., Hutchinson mine, Irwin, Pa.—Shipment by Deister Concentrator Co. of eight SuperDuty Diagonal-Deck No. 7 coal-washing tables to handle 3/8 x 0 coal.

New Equipment Maker Gets Sales and Engineering Help

Advisory boards for retailing and engineering were named at the end of June for Automatic Solid Fuels Equipment, Inc., manufacturer of the new Campbell stoker. The two groups were set up by the American Retail Coal Association at its June meeting at Cincinnati. The boards will work closely with retailers in individual towns and cities; help with promotion, sales and installation problems; and suggest policy for the manufacturer's board of directors.

Sue on Strip-Land Neglect

The Ohio Division of Reclamation has entered suit against two Waynesburg strip-mine operators and their bonding companies for failure to comply with the state's reclamation law. The suit alleges that M. M. Little & Son Co. failed to post bond for acreage stripped in excess of a permit granted in 1948 and that the lands have not been replanted. Judgment of $1,500 is sought from the mine operators and $1,549 from the bonding company.

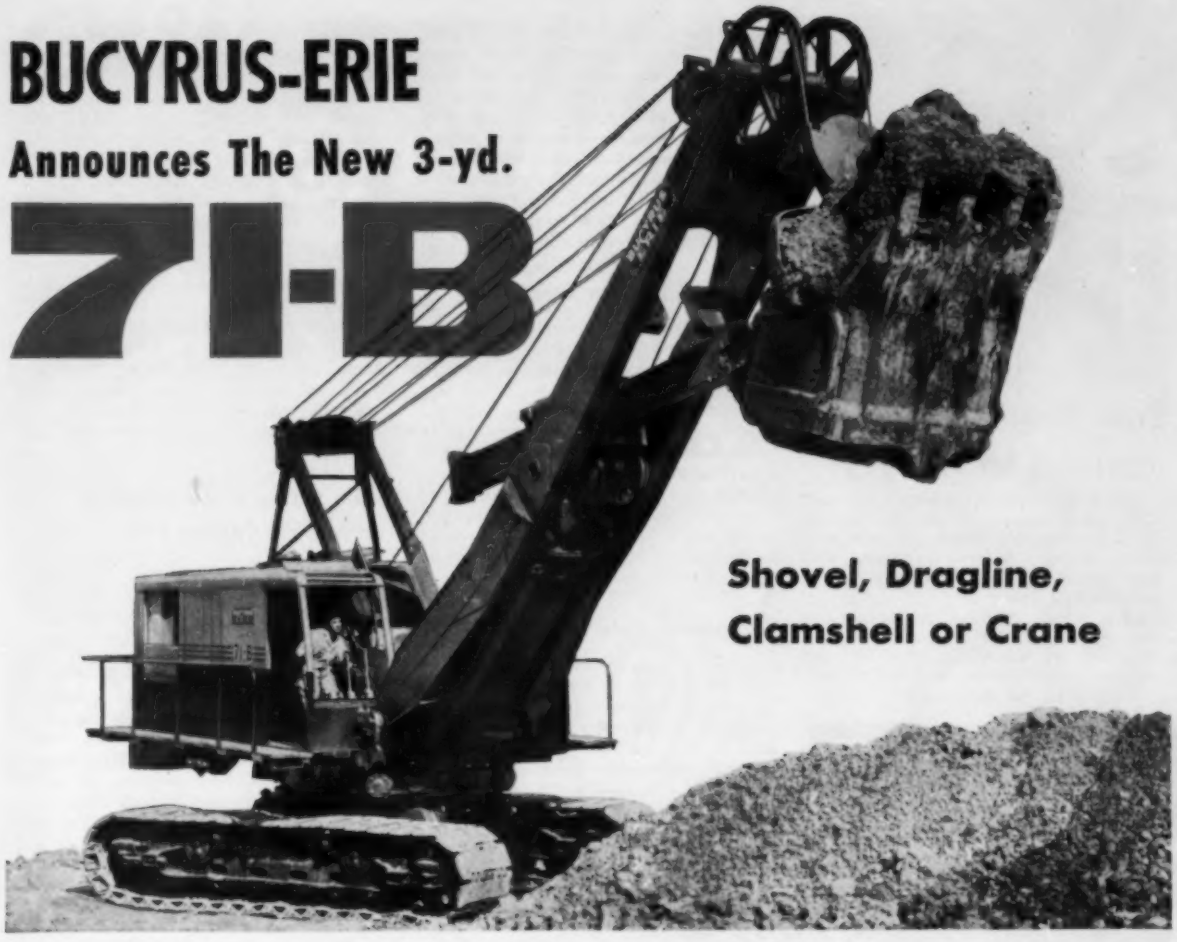
Amigo Mine Will Reopen

Officials of Amigo Smokeless Coal Co., Amigo, W. Va., announced late in June that the Amigo mine has been leased to Ralph Forrester, former mine foreman, and E. H. Walker, former tipple foreman, who soon will re-open the mine

BUCYRUS-ERIE

Announces The New 3-yd.

71-B



Shovel, Dragline, Clamshell or Crane

To meet the demand for a convertible 3-yd. excavator capable of high-speed, high-output performance, Bucyrus-Erie has developed the new 71-B. Designed from the ground up as a completely new machine, it has outstanding features that have been field-proved on other Bucyrus-Eries through thousands of machine-years of service.

- POSITIVE TWIN-ROPE CROWD
- RECTANGULAR INSIDE DIPPER HANDLE
- STRONG LIGHT BOOM
- FULLY INDEPENDENT BOOM HOIST
- CHOICE OF FOUR A-FRAMES
- ALL-PURPOSE HEAVY DUTY DIPPER
- FULL AIR CONTROL (not just air assist) except for drum brakes and swing and propel clutches
- TORQUE CONVERTER DRIVE (also available without torque converter)
- ONE-PIECE CAST STEEL REVOLVING FRAME
- 12 CONICAL HOOK ROLLERS
- DOUBLE FLANGE ROLLER PATH
- ROTATABLE SWING RACK GEAR
- FOUR OPTIONAL CRAWLER MOUNTINGS
- FRICTION STEERING CLUTCHES AND DIGGING BRAKES spring set and air released.

These and other features give the new 71-B a balanced and rapid work cycle for continuous high output, along with the durability for sustained operation and long life. For more information on this outstanding new excavator see your nearby distributor. 63E54C

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SOUTH MILWAUKEE
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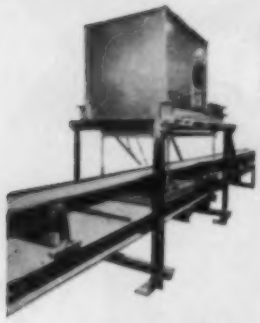
BUCYRUS ERIE

⅜- to 4-cu. yd. gasoline, diesel, and single-motor electric . . .

INDIVIDUAL DESIGN . . . for each model in the line

Shovels, Draglines, Cranes, Clamshells, Dragshovels.



how much has the conveyor carried to NOW?

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Applied to any size belt conveyor, either horizontal or inclined. The Weightometer gives a simplified and dependable record of your production, without interrupting flow of coal

Write for Bulletin 851

MERRICK SCALE MFG. CO.
Engineers and Mfrs. of Automatic Weighing Equipment
PASSAIC, N. J.

and operate it at a reduced rate of production. The new operators of the property will pay the cost of labor and supplies and use equipment belonging to Amigo Smokeless Coal Co. They also will build a new mine entrance. Amigo will pay them a fixed price for all coal produced. The Amigo mine was closed March 31. Under new management, the mine will employ 35 to 40 men and will produce up to 600 tons per day.

Utility to Dredge River Coal

The Pennsylvania Water & Power Co. has begun anthracite-dredging operations at Holtwood, Pa., on the Susquehanna River, to obtain fuel for new boilers that have increased the utility's capacity at Holtwood from 30,000 to 100,000 kw. The new facilities, costing about $6,000,000, include a washing plant designed to produce 2,400 tpd of clean coal and a 14-in suction dredge which is said to be the largest piece of floating equipment above tidewater on the Susquehanna.

Companies Hold Meetings

Coal prices have reached rock bottom and the future outlook is for slightly higher prices, stockholders of Truax-Traer Coal Co. were told at their annual meeting early in July. Pointing out that the company produced more coal in the last 12 mo. than in the year preceding, R. E. Snoberger, president, explained that the decline in prices over the past year had more than offset increased productivity and cost savings. Net income for the year now closed was $2,502,035, or $1.95 per share, compared with $2,802,377, or $2.21 per share, in the year preceding.

Earlier, at the end of June, stockholders of Peabody Coal Co., after a stormy session in which J. F. Elward, Chicago attorney, was elected a new director and a stock-option plan was approved for Otto Gressens, vice president of the company, were told that their company suffered a net loss of $636,855 in the 12 mo. ended April 30, 1954, compared with a profit of $700,972 in the year preceding. Stuyvesant Peabody, president, reporting more tons produced and sold this year than a year ago, predicted improved operations in the year ahead.

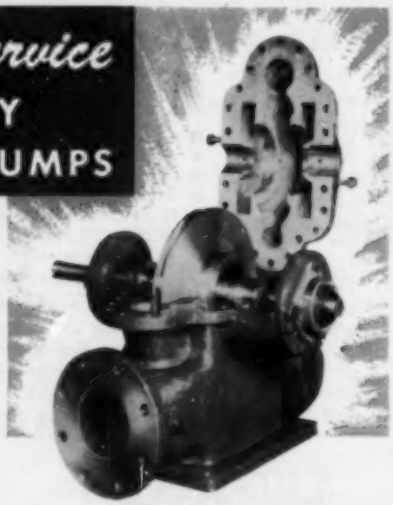
Aim Safety Drive at Mines Supplying Coal to TVA

Secretary of Labor James P. Mitchell announced July 13 that his department has started a full-scale campaign to enforce safety rules in small mines supplying coal to the Tennessee Valley Authority. He said that charges already have been filed against eight mines and that the department is considering action against 90 more.

The new drive apparently grew out of complaints by operators of larger mines, who protested that they have been unable to compete for TVA contracts because the small mines do not observe safety regulations. The UMWA also has brought pressure on the Labor Department to act on safety violations by small mines in the Tennessee field.

TVA recently has been under fire for its coal-purchasing practices.

Reliable Service
FLOOD CITY CENTRIFUGAL PUMPS



You can always depend on Flood City Centrifugal Pumps . . . all sizes, up to and including 8" discharge and up to 1500 gallons per minute capacity. Pump bodies and operating units can be furnished in either acid-resisting bronze or stainless steel.

PUMP REPLACEMENT PARTS

Flood City has, for many years, enjoyed an enviable reputation as a manufacturer of replacement parts for both centrifugal and plunger pumps. We are prepared to furnish replacement parts for the products of practically all pump manufacturers.

Impellers and other parts for centrifugal pumps can be furnished for any type, in either stainless steel or acid resisting bronze. We would be pleased to have our engineer visit your mine and sketch any parts you may desire a quotation on . . . at no obligation to you!

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Association Activities

Guyan Institute Reorganizes

Guyan Valley Mining Institute, inactive for about the past 10 yr, reorganized June 11 at the Logan, W. Va., county courthouse with 301 members enrolled. Officers were elected as follows: president, Young Lawson, West Virginia inspector-at-large; vice presidents, J. T. Whalen, supervising inspector, U. S. Bureau of Mines; L. F. Workman, general manager, Lorado Coal Mining Co., and C. W. Jones, president, Merrill Coal Co.; secretary-treasurer, Hurxtle White, West Virginia district inspector.

Reed Heads Kentucky Assn.

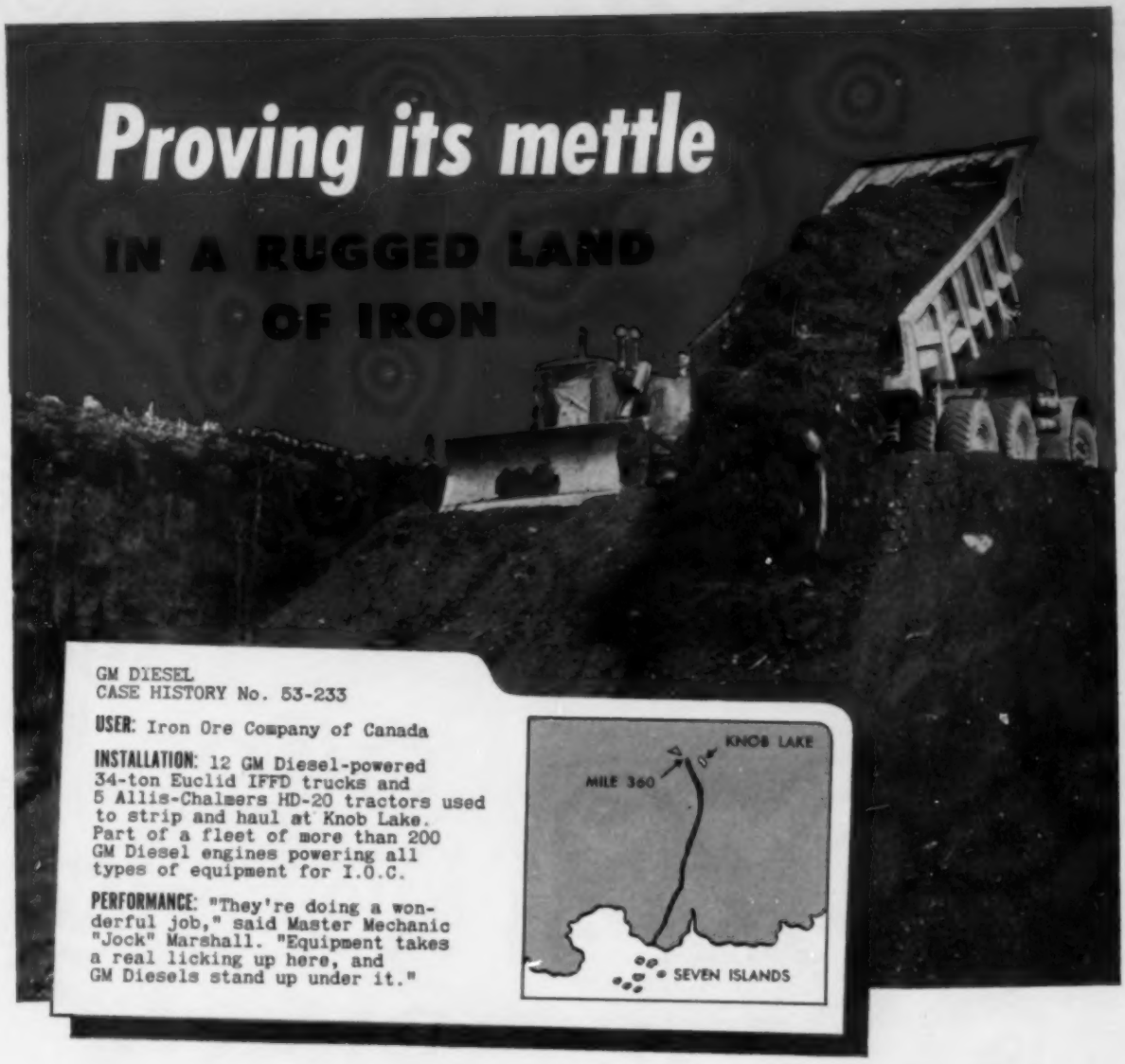
The Kentucky Coal Association, meeting at Lexington June 9, elected B. F. Reed, Drift, Ky., president, succeeding M. K. Eblen, Hazard. George Ward, Harlan, was reelected secretary-treasurer.

New Holmes Chapter at Valdez

At a recent organization meeting at Valdez, Colo., attended by 600 men, a new chapter of the Joseph A. Holmes

Proving its mettle

IN A RUGGED LAND OF IRON



GM DIESEL
CASE HISTORY No. 53-233

USER: Iron Ore Company of Canada

INSTALLATION: 12 GM Diesel-powered 34-ton Euclid IFFD trucks and 5 Allis-Chalmers HD-20 tractors used to strip and haul at Knob Lake. Part of a fleet of more than 200 GM Diesel engines powering all types of equipment for I.O.C.

PERFORMANCE: "They're doing a wonderful job," said Master Mechanic "Jock" Marshall. "Equipment takes a real licking up here, and GM Diesels stand up under it."

More than 200 GM Diesel Engines on vast Ungava Project

Up at "the Knob," 360 miles above Seven Islands terminal, the Iron Ore Company of Canada relies on General Motors Diesel-powered equipment—just as it has in construction of railroad, dams and facilities all along the line.

The big double-engine "Euc" and HD-20 shown above are benching access road to the rich Ruth Lake #3 deposit, first in the area to be opened for mining. They are part of a GM Diesel-powered fleet that proved its mettle by "walking" to the end of the line under its own power—a 250-mile trek over frozen tundra in blizzards and temperatures that reached 40° below zero.

These quicker-starting, faster-accelerating 2-cycle Diesels have been delivering trouble-free performance on double-shift, 20-hour-a-day schedules ever since they arrived—a tribute to both their rugged stamina and I.O.C.'s excellent preventative maintenance program.

Whatever your need for power—in trucks, tractors, air compressors, cranes, shovels—why not learn firsthand how much more profitably and dependably this versatile GM 2-cycle Diesel can deliver it? There is a GM Diesel distributor near you who will gladly give you all the facts—and you can count on him for prompt, efficient parts supply and service wherever you are.

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Single Engines ... 30 to 300 H.P. Multiple Units ... Up to 864 H.P.

It pays to STANDARDIZE on

... available in more than 750 models of equipment built by over 150 manufacturers.

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GENERAL MOTORS
DIESEL POWER

Another J&L First—

SpringKore WIRE ROPE

Combines Flexibility and Crush Resistance

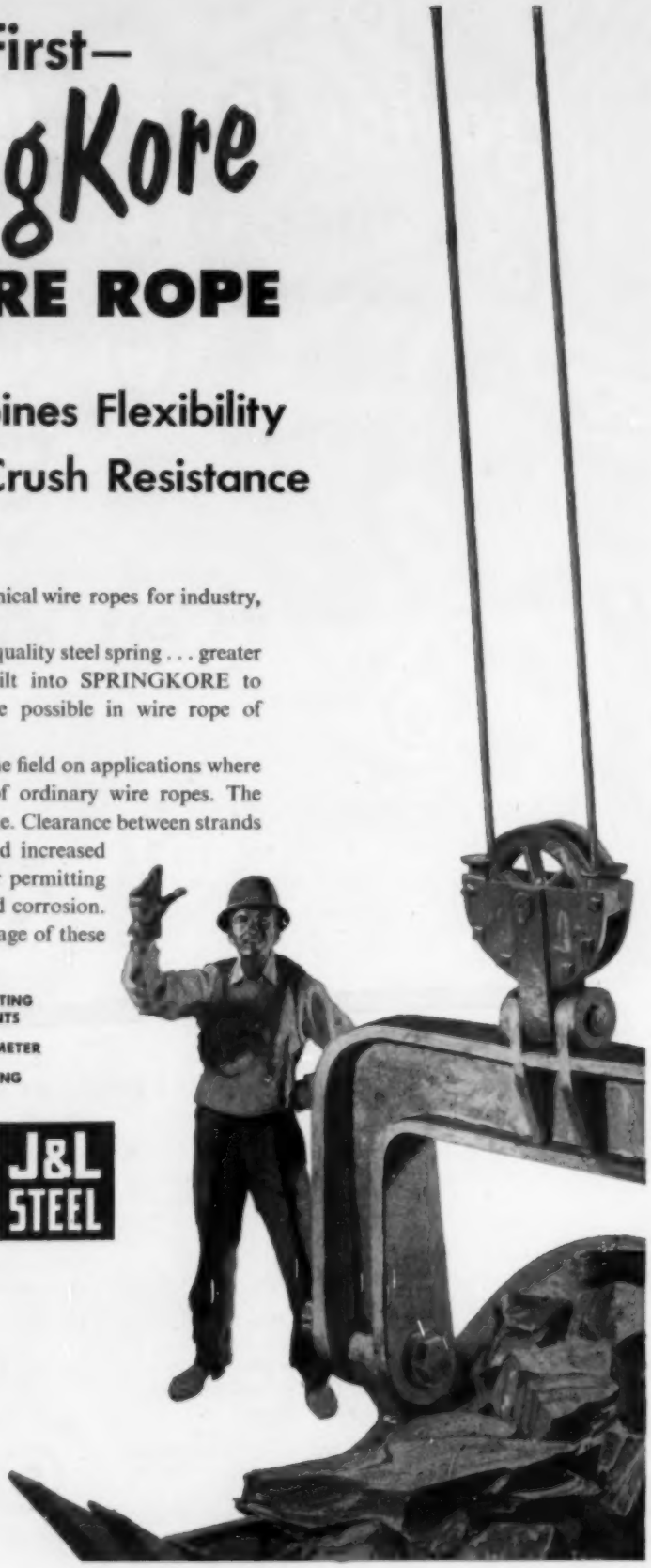
Always working to develop better, more economical wire ropes for industry, J&L has scored another first—SPRINGKORE.

The unique properties of a tightly coiled high quality steel spring . . . greater flexibility and resistance to crushing—are built into SPRINGKORE to provide resiliency and toughness never before possible in wire rope of equivalent strength and cost.

SPRINGKORE has *already* proved itself in the field on applications where heavy crushing action limits the service life of ordinary wire ropes. The diameter stays uniform for a longer period of time. Clearance between strands is maintained resulting in greater flexibility and increased fatigue life. The coiled spring forms a reservoir permitting excellent lubrication to reduce internal wear and corrosion.

Specify new SPRINGKORE and take advantage of these dollar-saving features:

- LONG TERM FLEXIBILITY
- RESISTANCE TO CRUSHING ACTION
- COMPLETE LUBRICATION
- MORE SUPPORTING CONTACT POINTS
- UNIFORM DIAMETER
- BETTER SPOOLING
- LESS INSIDE STRAND WEAR



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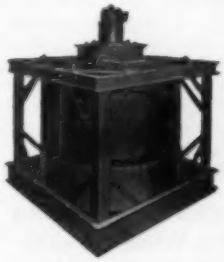
This efficient table eliminates 90% and upward of free impurities from normal coal feeds, always at top recovery while insuring a highly satisfactory refuse product.

Installed singly or in a battery, application to any tonnage can be efficiently and profitably handled. Whether your requirements are large or small, the SuperDuty is your best bet.

For full information, write for Bulletin 119.



CONCENCO FEED DISTRIBUTOR

The CONCENCO revolving feed distributor is a heavily fabricated all-steel machine with motor drive requiring 1 H.P. or less in operation. It effectively provides a splitting of feed into any desired number of equal portions, to accurately feed circuits or machines in battery for greater overall efficiency. Unexcelled for feeding coal washing tables.

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COMPANY
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CONCENCO PRODUCTS

★ *The ORIGINAL Deister Company* ★ *Inc. 1906*

MEETINGS

ASME: Fall Meeting, Sept. 8-10, Schroeder Hotel, Milwaukee, Wis.

Pennsylvania State Bituminous Safety Association: State-Wide First Aid Meet, Sept. 11, Ebensburg, Pa.

Central Pennsylvania Coal Producers' Association: Annual Meeting, Sept. 23-24, Bedford Springs Hotel, Bedford, Pa.

Mineral Producers' Association: Annual Meeting, Oct. 7, Hotel William Penn, Pittsburgh, Pa.

Kentucky State-Wide First Aid Meet, Oct. 9, Lexington, Ky.

National Safety Council: 42nd National Safety Congress and Exposition, Oct. 18-22, Conrad Hilton, Congress, Morrison and La Salle hotels, Chicago.

Kanawha Coal Operators' Association: Annual Meeting, Oct. 21, Charleston, W. Va.

Northern West Virginia Coal Association: Annual Meeting, Oct. 26, Fairmont, W. Va.

National Coal Association: Annual Meeting, Nov. 17-18, Hotel William Penn, Pittsburgh, Pa.

Safety Association was formed to serve employees of Frederick mine, Colorado Fuel & Iron Corp. Officers are: Isidore Bueno, president; Alfonso Sandoval, vice president; Joe Apodaca, secretary-treasurer; F. C. Bennett, safety director; Joe Peduzi, educational director; Frank Palmer, social director, and Dr. J. W. Hudson, health director.

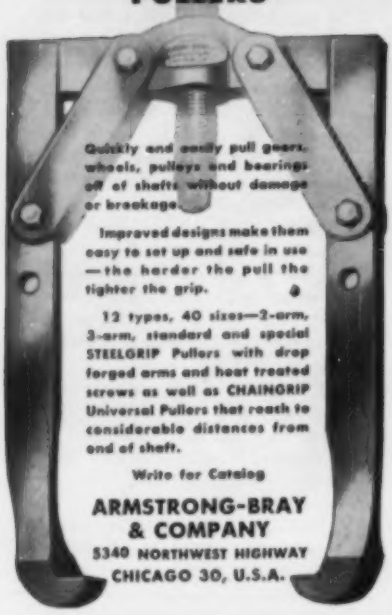
American Retail Coal Assn. Elects Scherer President

The American Retail Coal Association, at its 19th annual convention in Cincinnati, Ohio, June 15-16, elected Walter K. Scherer, Ottawa, Ill., president. Other officers are: vice presidents, Edward C. Pankow, Detroit, and V. E. Montgomery, Cincinnati; treasurer, Gilbert E. Maggs, Chicago; secretary, A. W. Honecker, Grand Rapids, Mich.; executive secretary, R. J. Johanson, Chicago.

Jewell Heads ACSA

Meeting at Colorado Springs, Colo., June 23-26, the American Coal Sales Association elected officers as follows: president, S. L. Jewell, vice president and sales director, Southern Coal Co., Chicago; vice presidents, H. P. Junod, Pickands Mather & Co., Cleveland; E. P. Messham, Logan & Kanawha Coal Co., Inc., Cincinnati; and W. S. Webster, Walter Bledsoe & Co., Terre Haute, Ind.; secretary treasurer, D. H. Swanson, Snyder & Swanson, Inc., Columbus, Ohio. Elected to the executive committee for 3-yr. terms were: R. C. Clark, Baton Coal Co., Pittsburgh, Pa.; A. K. Greene, Oglebay Norton & Co., Cleveland; and H. D. Wright, Republic Coal & Coke Co., Chicago.

ARMSTRONG-BRAY
GEAR and WHEEL PULLERS



Quickly and easily pull gears, wheels, pulleys and bearings off of shafts without damage or breakage.

Improved designs make them easy to set up and safe in use — the harder the pull the tighter the grip.

12 types, 40 sizes—2-arm, 3-arm, standard and special STEELGRIP Pullers with drop forged arms and heat treated screws as well as CHAINGRIP Universal Pullers that reach to considerable distances from end of shaft.

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New Books for Coal Men

New Transformer Standards

NEMA Standards for Transformers, Publication No. TR 1-1954. This new set of standards for electrical transformers includes practical data on rating, performance, testing and manufacture of power and distribution transformers today. Information is included on the limits of temperature rise for three groups of dry-type transformers, new electrical and mechanical characteristics of cover bushings, revised radio-influence voltage levels, and new paint color standards. *Paper-bound, punched for ring binders, $3 per copy, National Electrical Manufacturers Association, 155 East 44th St., New York 17, N. Y.*

Better Use of Compressed Air

Compressed Air Handbook, 2d Edition. This revision, based on a 12-yr study of on-the-job case histories, includes twice as many descriptions of applications as the first edition, a new chapter on centrifugal compressors, and information on recent advances in all fields of compressed-air power. The book was prepared by the Compressed Air & Gas Institute. *420 pp. 6x9-in; cloth. $8, McGraw-Hill Book Co., 330 West 42d St., New York 36, N. Y.*

Coal on the Farm

Coal-Fired Crop Dryers Increase Farm Profits: The BCR Crop Dryer Report. This brand-new booklet, result of several years of research, includes data on drying hay, corn and other crops, comparative fuel costs, case histories, practical pointers for better efficiency, and specifications for the BCR dryer. *27 pp. 8½x11-in.; paper. $2.50, Bituminous Coal Research Products, Inc., 980 Kinnear Road, Columbus 8, Ohio.*

More Ways to Achieve Safety

Two new publications by the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill., suggest ways to improve the safety record. The publications are:

Safety Devices and Ideas. This book describes over 90 devices that have been found effective in plant use. Each device is illustrated. Most of the devices were devised and built by workers and supervisors and therefore are not available commercially, but they are easily built and installed locally. *Price: to members, $1.25 per copy; non-members, $2.50.*

What's in It for Me? This booklet tells its message with few words and many color cartoons. It encourages the worker to help himself to safer living by aiding the company in its fight against accidents. *16 pp. 4x9-in. Single-copy and quantity prices upon request to National Safety Council.*

Help in Mathematics

Lefax Mathematical Data Book. A newly revised looseleaf pocket manual containing tables and formulas for solving problems in arithmetic, geometry, algebra, trigonometry, analytical geometry and calculus. *334 pp. $2.25. Lefax, Philadelphia 7, Pa.*

Interior Department Objects To Bill on Mine Sealing

Assistant Secretary of the Interior Felix E. Wormser has lodged objection to a bill introduced in Congress by Rep. Bailey (W. Va.) that would require the Bureau of Mines to seal off abandoned coal mines in a drive to eliminate stream pollution. Mr. Wormser argued that mine sealing is more properly the responsibility of the states where coal is mined and that the costs of locating and sealing all abandoned mines would be tremendous.

TV Film on Anthracite Gains Wide Bookings

The anthracite industry's recently released industry color film, "Black Diamonds," has been widely booked by television stations in New England, New York and New Jersey and will be viewed by thousands of fuel users in those areas. In addition, anthracite dealers have engaged showings of the 27-min film for chambers of commerce, women's clubs and fraternal and service groups. The motion picture was filmed in cooperation with the College of Mineral Industries of Penn State University. It portrays the origin and history of the anthracite industry; the mining, processing and distribution of anthracite; and the newest developments in automatic home-heating systems.

You **Have The World's Best Laboratory for Testing Hoists**

Specifications are helpful guides in choosing the right hoist for your job. Factory tests give further assurance. But the hoists on your own job hold the key to your wisest final choice. These hoists have been tested in the world's best laboratory for your purposes. They have been operated by *your* men under *your own* exacting conditions. Their performance takes the guesswork out of choosing.

That's why Coffing Safety Pull Ratchet-Lever Hoists are standard on so many jobs in the tipple or mine. Their record of durability and safety for more than 25 years under actual job conditions puts them in a class by themselves as the wise choice.

Examine the hoists in *your* "laboratory." Which is the oldest one in good working condition? When safety is vital, which hoist do your men use? We believe the answer is Coffing — the *original* ratchet-lever hoist. If you would like more information on the complete line of Coffing Ratchet-Lever hoists, write for catalog G8S.

Quik-Lift Electric Hoists
Hoist-Alls • Mighty-Midget Pullers • Spur-Gear Hoists
Differential Chain Hoists
Load Binders
I-Beam Trolleys

COFFING HOIST COMPANY
Danville, Illinois

RECOVERS SALABLE COAL
MINIMUM CLEANING COST-
3¼¢ PER FOOT
HYDRAULIC CYLINDERS CONTROL
HEIGHT OF DIGGER PLATE AND BOOM
BLADES CLEAN BOTH SIDES OF TRACK

AMERICAN MINE DOOR CO.
2037 Dueber Ave., Canton 6, Ohio
Rock Dusters • Switch throws • Car Transfers • Signal Systems • Automatic Doors

The "Canton" TRACK CLEANER

. . . fabulous money maker of the whole Mining field —Hard and Soft Coal — Iron Mines — Copper Mines — Potash Mines — Salt Mines.

Proved self-liquidating, short time.

Write for authentic operating figures, and names of mines.

"CANTON" QUICK ON CABLE SPLICERS

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Please send your change of address together with your old address to:

DIRECTOR of CIRCULATION
COAL AGE, 330 West 42nd Street
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DON'T FORGET TO NOTIFY YOUR POSTMASTER, TOO!

CORE DRILLING
—anywhere

"We look into the Earth"

PENNSYLVANIA Drilling CO.

DRILLING CONTRACTORS AND MFRS.

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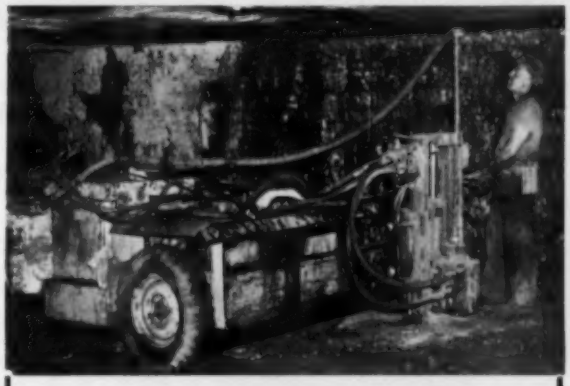

CUT BOLTING COSTS!

FLETCHER ROOF CONTROL DRILLS reduce costs in every phase of roof bolting.

More FLETCHER machines are built and sold — so the price, feature for feature, is lower. High thrust cutting action gives increased bit life, decreased bit cost. Greater capacity means less labor, more bolts per man. Rugged, simple construction provides longer life, minimum down time. Speedy, economical parts service reduces inventory and operating expense.

Hundreds of FLETCHER Roof Control Drills now in use are cutting roof bolting costs throughout the country. Write today for information on the machine designed for your mine and your operating conditions.

J.H. FLETCHER & CO.
ENGINEERED MINING EQUIPMENT
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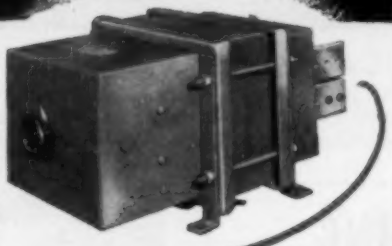
LET THE RECORDS SPEAK!

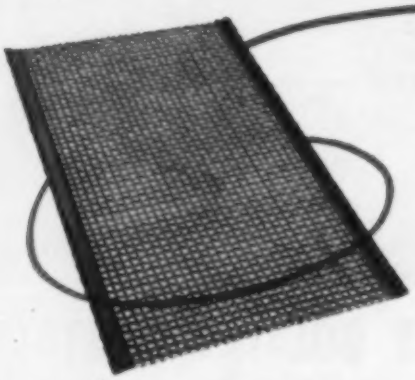
HANCO SCREEN HEATERS

ELIMINATE *Costly* SCREEN BLINDNESS

FASTER, MORE ACCURATE SIZING

HANCO electric heaters are engineered to meet top capacity requirements for heating **all** metallic screen cloth. Mechanical abuse such as "beating" or brushing can be **eliminated completely** when you install a HANCO electric heater. Treat your screens the modern way—get HANCO.





Available in five different assemblies. HANCO engineers have designed and constructed electrical screen heaters to fit YOUR make of screen. Note: Reduction in openings can be effected to meet ever changing specifications.

LOOK AT THESE FEATURES

Faster screening—faster processing means fewer "returns".

Elimination of mechanical abuse to keep screens open.

Longer screen life — no manual cleaning increases screen life up to 800%.

Fewer shut downs for replacement of worn screens.

HANCO quick change assemblies assure easy cloth changes.

Low maintenance cost. HANCO heaters are designed for heavy-duty service.

SEND FOR OUR COMPLETE BULLETIN

Hanco

F. R. HANNON & SONS

1605 Waynesburg Rd. S.E., Canton 7, Ohio

PIONEERS IN ELECTRIC SCREEN HEATING — FIRST IN THE FIELD OF LOW VOLTAGE AND HIGH AMPERAGE SCREEN HEATING

COAL MEN ON THE JOB . . .

Russell Fork Coal Co., Inc.
Praise, Pike County, Ky.

DAY-SHIFT assistant foremen (left photo) — Clarida Saunders (seated, left), Eldon Scott, L. T. Potter, Luther Salyer (standing, left), Elmer Belcher and Hollis Damron.

SECOND-SHIFT (right photo)—Harold Philips (left), Everett Senter, Harold Reid, Hansel Stapleton, assistant foremen; and Shannon Coleman, general foreman.

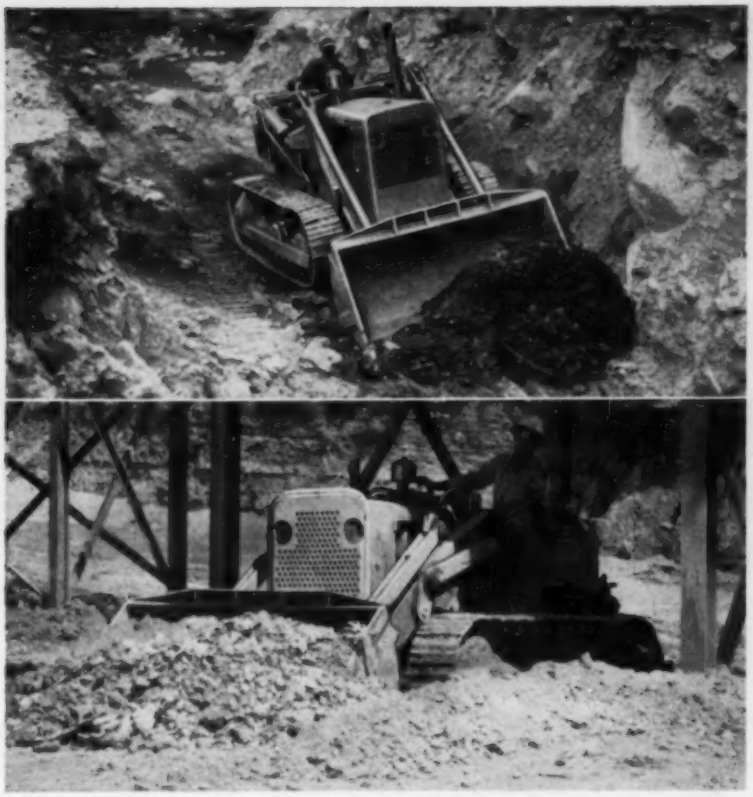
What color should you paint a belt conveyor?

Most of them are painted green. And if you get a BARBER-GREENE Conveyor, it's already painted. That's just part of B-G's complete standardization.

see your B-G distributor or write

Barber-Greene

AURORA, ILLINOIS, U.S.A.



Allis-Chalmers Tractor Shovels

bring new flexibility to mining operations

ALLIS-CHALMERS offers a complete line of time-tested Tractor Shovels to mechanize mining operations in a new, better way . . . four sizes with standard bucket capacities from one to four cubic yards. These units bring year-round, time- and money-saving advantages on a wide variety of the toughest mine jobs . . . loading, stockpiling ore; handling sand, gravel and other bulk materials; cleaning up around hoppers, conveyors, shovels; building access roads; maintaining tailing dumps; digging, lifting, dozing and grading on many other mine jobs.

Important advantages include: more track on the ground for better stability, traction and flotation . . . truck wheels, support rollers and idlers that require lubrication only once every 1,000 hours . . . all-steel welded construction to withstand the shock and strain of tractor-shovel work . . . simplified hydraulic system for shovel control . . . lugability that assures unfaltering performance . . . minimum service requirements.

In addition, buckets for light materials, rock buckets, lift forks, bulldozer blades and other quick-change attachments are also available.

The Allis-Chalmers dealer in your area will gladly discuss earth-moving and Tractor Shovel applications with you.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

HD-5G

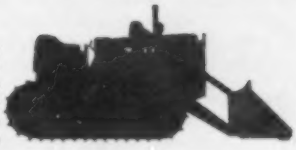
40 drawbar hp
Weight — 16,200 lb
Standard Bucket Capacity — 1 cu yd
Dumping Height — 9 ft, ½ in

HD-9G

72 drawbar hp
Weight — 29,900 lb
Standard Bucket Capacity — 2 cu yd
Dumping Height — 11 ft, 4 in

HD-15G

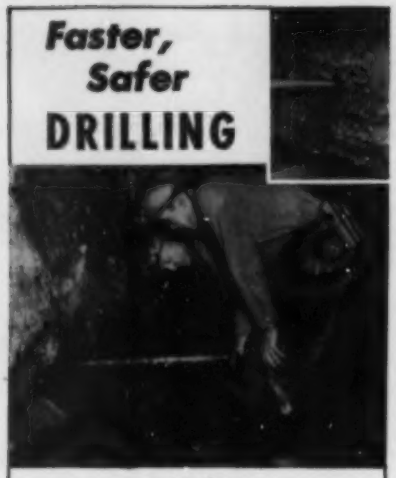
109 drawbar hp
Weight — 47,580 lb
Standard Bucket Capacity — 3 cu yd
Dumping Height — 11 ft, 7 in
With Torque Converter Drive
135 net engine hp
Weight — 48,030 lb



HD-20G

175 net engine hp
Torque Converter Drive
Weight — 63,325 lb
Standard Bucket Capacity — 4 cu yd
Dumping Height — 12 ft, 10 in

Faster, Safer DRILLING

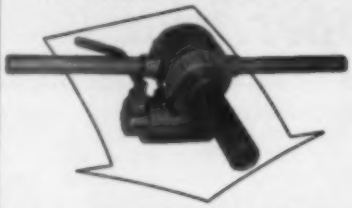


with the

SCHROEDER

MODEL 12-B

COAL DRILL



Light-Weight! Hydraulic!

The Model 12-B Coal Drill gives you safe, dependable fast drilling with complete operational safety . . . no spark, no kick . . . all electrical hazards are removed yards from the drill. Powered from the hydraulic power systems of standard mining equipment, the Model 12-B is simple in design. It has a minimum of operating parts resulting in greatly reduced maintenance costs.

Write or call for details and demonstration.

Hydraulic Power Units are available for several non-hydraulic mining units. Wheel or skid mounted power units can also be furnished. Write or call for particulars!

Hydraulic, Electric & Pneumatic Mining Equipment

SCHROEDER BROTHERS

3116 PENN AVENUE
PITTSBURGH 1. PA.

EXPRESS 1-1571

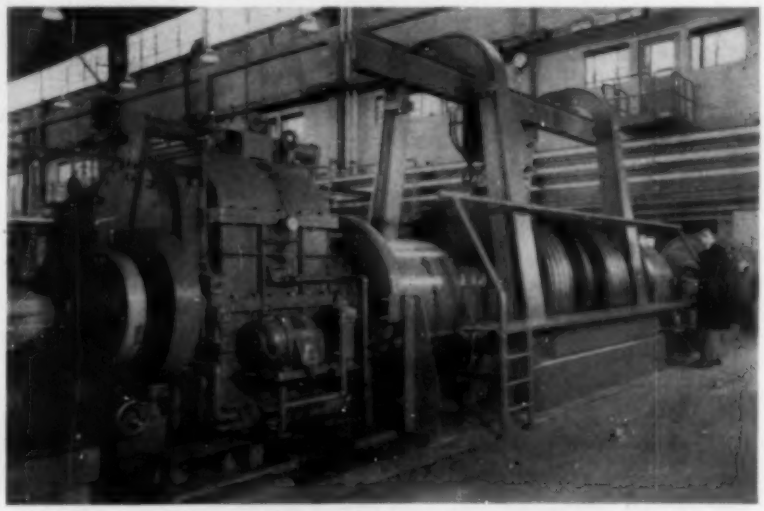
Among the Manufacturers

Roberts & Schaefer in Merger

Negotiations have been completed by Thompson-Starrett Co., Inc., International builder and contractor, New York, for acquisition of Roberts & Schaefer Co., it has been announced by J. R. Van Raalte, president. Consummation of the arrangement, Mr. Van Raalte declared, is proposed by the merger into Thompson-Starrett of R. & S. New York Securities Corp., with stockholders of both companies scheduled to vote on the matter at special meetings July 26. Established in 1899, Thompson-Starrett has since completed in excess of $1 billion of construction for clients and on completion of the merger, it was reported, intends to embark upon a program of further expansion and diversification through the acquisition of other industrial corporations. Management of the continuing Thompson-Starrett Co., Mr. Van Raalte revealed, will include: Chairman, Robert E. Sloan, present R. & S. executive vice president; chairman of the executive committee, Mr. Van Raalte; chairman of the finance committee, Jennis M. Doroshaw, president of R. & S. New York Securities, and Delaware Roberts & Schaefer; president and chief administrative officer, John E. Kalinka, now R. & S. chairman; vice presidents, Warren R. Hedden and Robert Zaborowski, now in similar posts with Roberts & Schaefer; and George J. Meyers, now a Thompson-Starrett vice president.

G-E Holds Maintenance Forums

Industry in the next 10 yr will double its maintenance expenditures to about $22 billion annually, it was forecast during a Cleveland speech by H. F. McCullough, general manager of the General Electric Co.'s service shops department. He spoke before 150 engineering, manufacturing, and maintenance executives of Cleveland area industries at the first in a series of G-E sponsored "Productive Maintenance Forums" to be held in 26 other major U. S. cities. Industry must direct to maintenance functions the same degree of management skill now devoted to production, and present and future production demands require the training of highly skilled and well planned maintenance to prevent idle machinery, Mr. McCullough said. As a part of its program for the forums, General Electric is showing a new motion picture entitled "Productive Maintenance," which emphasizes how to



Johns-Manville Opens New Research Facilities

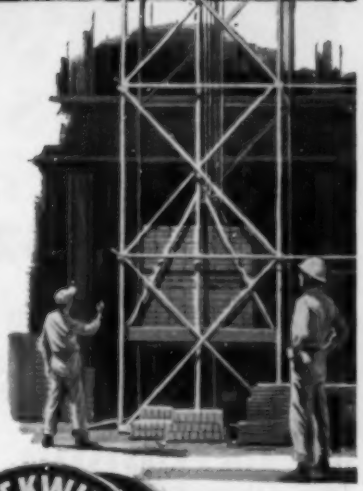
THE WORLDS LARGEST laboratory devoted to research and development of asbestos brake linings and other friction materials recently was opened by the Johns-Manville Corp. in Manville, N. J., as the company's answer to increasing demand for better control and safer stopping of all types of mechanical equipment. One of the several unusual machines installed in the new laboratory is a 200-ton dynamometer (above), said to be the largest and most versatile inertia-type unit of its kind ever built for testing friction materials for aircraft, truck and industrial equipment brake materials. It required more than 2 yr to build and represents 10 yr of research, design and development by the company's scientists and engineers. At the time the new addition to the Johns-Manville Research Center was opened, the company also announced the enlargement of its plant at Waukegan, Ill., to nearly double its capacity for production of passenger-car and industrial friction material, as part of an $18,500,000 program for expansion and improvement in 1954. Opening of the new facilities marked Johns-Manville's 74th year in the friction material business, the company pointed out.

MUSCLES OF STEEL
took the load off his back

Sweat and a strong back just aren't enough when it comes to meeting the stepped-up demands of modern construction work. Today's contractors and builders call on *muscles of steel*—sturdy wire rope—to lift and carry their heavy loads.

Supplying these *muscles of steel* to the giant that is American industry is our big job here at Wickwire—a job that has commanded our vigilant care and painstaking quality control for over half a century.

In the mines and the quarries. In the logging camps and the oil fields. On construction and highway projects. With the fishing fleets and in materials handling. Wherever wire rope is used, Wickwire Rope has earned an outstanding reputation for efficiency, utmost safety, long economical service and unfailing reliability.



every industry benefits from wire rope

WICKWIRE ROPE

CF&I PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

2487

THE COLORADO FUEL AND IRON CORPORATION—Denver • Pueblo • Wickwire (Fuel) • Denver • Pueblo • Wickwire (Fuel) • Pueblo • Salt Lake City • Ensley
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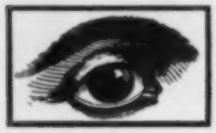
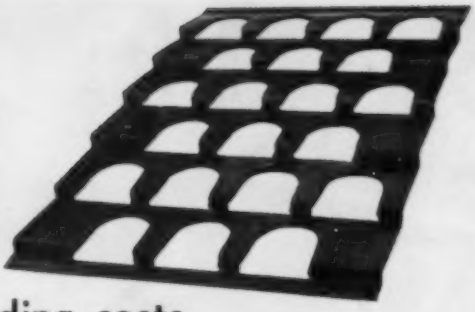
WICKWIRE SPENCER STEEL DIVISION—Buffalo • Buffalo • Chattanooga • Chicago • Detroit • Duluth • Houston (Pa.) • New Orleans • New York • Philadelphia

How to see





through blinding costs . . .

use Hendrick flanged lip screen

Costs caused by blinding on vibrating and shaking screens are an unnecessary drain on profit. By practically eliminating costly delays due to blinding, Hendrick Flanged Lip Screen can greatly help your profit picture.

Secret of Hendrick Flanged Lip Screens' success is their tapered shape of openings and steps that provide far better separation. Equally as ideal for shaking and gravity screens and discharge chutes, Hendrick Flanged Lip Screens are furnished with openings varying in size from .010 x .025 x ½" to 10½ x 11½ x 13". The screen shown above measures 60 x 96" — perforations are equivalent in screening size to 14" diameter holes. It is being successfully used to size block coal. For more details write Hendrick direct.

Hendrick
MANUFACTURING COMPANY

41 DUNDAFF ST., CARBONDALE, PA. • *Sales Offices in Principal Cities*

Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids

SERVICE RECORD STAMLER CAR-SPOTTERS...

TOTAL SALES LAST 5 YEARS

$250,000.00

REPAIR PARTS SALES 1953

$2,184.58

WE ARE PROUD OF THIS RECORD

THE W. R. STAMLER CO.

PARIS, KENTUCKY

Schroeder Bros., Exclusive Eastern Sales Agent, Pittsburgh, Pa.
Union Industrial Corp., Carlsbad, N. Mex.

get the most productivity out of existing facilities. Photographed in full color, the 25-min. movie dramatizes the G-E concept and its 5-step plan of productive maintenance.

U. S. Rubber Appoints

Matthew J. Delehaunty has been appointed manager of commodity sales for the mechanical goods division, United States Rubber Co., New York, succeeding the late Harry M. Frecker. Formerly manager of industrial sales, Mr. Delehaunty will combine the function of both offices in his new post. With U. S. Rubber since 1922, Mr. Delehaunty was named Pittsburgh branch manager in 1949 and manager of industrial sales last year. H. Leon Moran has been appointed new products manager for the mechanical goods division, a newly-created post in which he will be responsible for speeding the adoption and commercialization of new products. Mr. Moran was formerly factory manager of the division's Ft. Wayne plant and will continue to make his headquarters in Ft. Wayne. Walter F. Brown, formerly north-central division manager, has been promoted to assistant sales manager for the U. S. tires division of U. S. Rubber. Succeeding Mr. Brown as north-central division manager is J. A. Napier, who had been district manager at Pittsburgh. J. S. Baker, formerly assistant district manager, moves up to district manager at Pittsburgh.

NMS Appoints Two

National Mine Service Co. has named J. J. Mahoney manager of used equipment and rebuilding sales. Formerly assistant manager of the department, Mr. Mahoney will maintain headquarters in Beckley, W. Va. Charles F. Barefoot has been appointed purchasing agent for the southern divisions of National Mine Service, with offices in Beckley.

Quaker Rubber Names Pender

W. H. Pender has been appointed manager, belting sales, Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia. Mr. Pender, who has been with Quaker since 1947, previously was field engineer for conveyor and elevator belting and has 20-yr experience in the rubber industry, concentrated primarily in the manufacture and sale of belting.

Firth Sterling Moves Roller

J. S. Roller, assistant general sales manager, has been named general sales manager, Firth Sterling, Inc., Pittsburgh. Mr. Roller joined the company in 1951 as vice president and general manager of The Method X Co., a Firth Sterling affiliate, after having served for 15 yr in various capacities in the sales department of Republic Steel Corp. In line with its policy of expanding field engineering service, Firth Sterling has appointed James L. Zimmerman a carbide service engineer in the company's Chicago district, headquartered at Melrose Park, Ill.

Gardner-Denver Elects

Gifford V. Leece has been elected president of Gardner-Denver Co., Quincy,

when Overburden squeezes the profits out of stripping . . .

drill!

CARDOX Surface AugerMiner

CARDOX Surface AugerMiner teams up with mechanized loading for fast, lower-cost coal production.

Restores Abandoned Workings to Profitable Production

When excessive overburden puts a stop to conventional stripping, CARDOX Surface AugerMiners put mines back into profitable production. Drilling 100 to 120 feet, they salvage volume tonnage at a cost usually far less than for the original working. This "bonus" tonnage is *easy to get.*

CARDOX Surface AugerMiners are simply trucked or towed on their detachable wheels to the exposed surface. They are self positioning to the height of the seam. A rugged, 145 H.P. engine drives augers that drill holes up to 38 inches in diameter. AugerMiner coal is *clean* and *free of rock or shale* — because directional control keeps the auger boring into the best part of the seam. Coal can be loaded mechanically into trucks without further processing. A built-in retriever makes it easy to add or remove the 6-foot auger sections.

If you have a seam where overburden has squeezed the profits out of conventional stripping, you may have abandoned your best paying tonnage! Investigate the CARDOX Surface AugerMiner. See your CARDOX Representative — or write for AugerMiner Bulletin.

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Camden-on-Gauley, W. Va.
Phone: Camden-on-Gauley 2181

Evansville, Indiana
307 Northwest Fifth St.
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Sprague & Henwood's "ORIENTED" Diamond Bits

Cut Faster
Last Longer
Cost No More

for quick action call DIAMOND 4-8507 at Scranton

Most Economical Diamond Bits Ever Produced

After proving in our own world-wide contract drilling operations that Sprague & Henwood Oriented Diamond Bits (in which each individual diamond is set with its hardest edge or "vector" toward the work) cut much faster and last much longer than when diamonds are set at random, we made them available to other users and THOUSANDS are now cutting costs for diamond-drill operators throughout the United States and many other countries.

Specialized equipment and large-scale production enable us to furnish them in a wide variety of types and sizes, with either cast- or powdered-metal matrices, at no advance in price; making them the most economical diamond bits ever produced.

Bulletin 320 illustrates and describes all types and gives complete working data. Write for a free copy and tell us about your diamond drilling requirements. Our experienced executives welcome opportunities to make money-saving suggestions.

SPRAGUE & HENWOOD, INC. **SCRANTON 2, PENNA.**

BRANCH OFFICES: NEW YORK · PHILADELPHIA · PITTSBURGH · GRAND JUNCTION, COL. · BUCHANS, NEWFOUNDLAND

WEIGH IT ON THE GO!

Builders Conveyoflo—the modern conveyor meter — totalizes the weight of dry material passing over conveyor belts. Continuous, automatic, extremely accurate — Conveyoflo is installed right in your present conveyor, or can be furnished as a separate, self-powered conveyor and scale unit. Capacity is limited only by the capacity of the conveyor belt itself.

EXCLUSIVE FEATURES

- Accurate . . . within ± ½ of 1% of actual weight from maximum to 50% of meter's rated capacity; within 1% from 50% to 25% rate; within 2% from 25% to 10% of rated capacity.
- Automatic totalizer compensation for variations in belt speed and changes in belt weight.
- Responds accurately to rapid load variations.
- Paces auxiliary equipment (feeders, controllers, continuous blending processes, etc.) and operates secondary instruments.

Write for Bulletin 550-H4. Builders-Providence, Inc. (Division of B-I-F Industries, Inc.), 391 Harris Avenue, Providence 1, Rhode Island.

BUILDERS-PROVIDENCE
DIVISION OF B-I-F INDUSTRIES, INC.
METERS FEEDERS CONTROLS

Ill., and Benjamin C. Essig has been elected executive vice president. With the company since 1922, Mr. Leece served in various positions at the Quincy plant and on the sales staff, and has been vice president and sales manager since 1947. Mr. Essig, who joined the company in 1923, was promoted to sales manager for Gardner-Denver's mining and construction divisions in 1933, and in 1938 was elected vice president in charge of the Denver plant.

Marion Acquires Osgood Co.

The Marion Power Shovel Co., Marion, Ohio, has acquired the controlling interest in The Osgood Co. and the latter's wholly owned subsidiaries, The General Excavator Co. and The Commercial Steel Castings Co., by an exchange of Osgood stock for Marion Power Shovel stock. The Osgood Co. and the General Excavator Co. manufacture lines of power shovels and cranes in sizes up to 2½ cu yd that supplement the line of machines built by Marion, which range from 1 to 45 cu yd. The Commercial Steel Castings Co. is a foundry operation. According to John P. Courtright, Marion president, all companies involved are expected to retain their separate identities and further studies will be necessary before combined operating plans can be developed.

General Cable Ups Barnes

Arthur Z. Barnes, southwestern district sales manager, has been elected assistant to the president of the General Cable Corp., New York. Mr. Barnes will have his headquarters in Dallas, Tex., and will also be responsible for district sales offices in St. Louis, Kansas City, Memphis and New Orleans. He first joined General Cable in 1929 as Dallas district sales manager.

A. O. Smith Sales Official

Robert O. Dehlendorf has been named assistant general sales manager of the electric motor division of A. O. Smith Corp., with headquarters at the Dayton, Ohio, divisional office. Mr. Dehlendorf has been with the Chicago district office for the past 4 yr and previously was with Jack & Heintz, Inc., as district sales manager for motors in New York.

Three in New A-C Posts

Three organizational changes at the Norwood works of Allis-Chalmers Mfg. Co. include the appointment of Thomas C. Knudsen, manager of the Texrope drive section since 1944, as assistant to the general manager in charge of the mechanical product development laboratory. Vernon B. Honsinger, formerly engineer-in-charge, research laboratory, has been named assistant to the general manager in charge of the electrical product development laboratory. Dwight H. Lory, formerly assistant manager of the Texrope drive section, has been appointed manager of that section, to succeed Mr. Knudsen.

Bay City Elects President

Bay City Shovels, Inc., Bay City, Mich., has elected Donald E. Hawkins presi-

When you want high strength in your mining equipment

start with a high strength steel

USS TRI-TEN STEEL **gives you high strength plus high resistance to impact at low temperatures** This tough, versatile steel is ideal for use in heavy-duty equipment which must operate in sub-zero weather. For it retains its toughness and withstands shock under low temperature conditions. Will keep your shovels, draglines and dozers going when others fail.

USS COR-TEN STEEL **gives you high strength plus high resistance to corrosion** This high strength steel has 4 to 6 times the resistance to atmospheric corrosion of ordinary structural steel, and 2 to 3 times that of copper steel. This property helps to assure long life and low maintenance cost in mine cars and similar equipment subject to atmospheric corrosion.

USS MAN-TEN STEEL **gives you high strength plus resistance to abrasion** This lower-cost grade has a higher resistance to abrasion than ordinary carbon steel. In addition to high strength and toughness, it has workability and weldability to a higher degree than obtainable in carbon steel at the same strength level.

• • •

• Used singly or in combination, these USS High Strength Steels will give your equipment the strength and stamina to work faster and last longer—to boost production, to cut repair costs. For all these famous steels have a 50% higher yield point, and greater resistance to wear, impact, abrasion and fatigue than ordinary carbon steel.

You can use any of these USS High Strength Steels in the same thickness as carbon steel to increase the strength and durability of equipment, without increasing its weight. Or, by substituting these steels in thinner sections for carbon steel, you can reduce the weight of the equipment without reducing its strength. Or, on certain applications, you can increase the size and capacity of equipment without increasing its weight.

For more information or application data concerning USS High Strength Steels, call or write our nearest office.

NEW BOOK GIVES COMPLETE STORY OF USS COR-TEN STEEL

Just off the press, this 58 page book is crammed with factual data about USS COR-TEN Steel. Contains list of mechanical properties and characteristics, shows savings that can be affected through its use. Send for your free copy today.

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USS HIGH STRENGTH STEELS

USS

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UNITED STATES STEEL

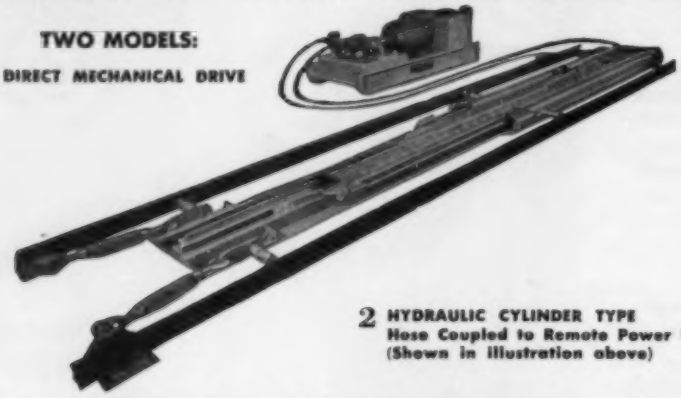
MOVE COAL FASTER

with the efficient time-proved

NOLAN PORTA-FEEDER

TWO MODELS:

1 DIRECT MECHANICAL DRIVE



2 HYDRAULIC CYLINDER TYPE
Hose Coupled to Remote Power Unit
(Shown in illustration above)

These two Nolan models will help you meet every requirement and condition in spotting cars for loading . . .

The NOLAN Porta-Feeder is used in the Princess Elkhorn Coal Co. Patsy Mine.

and can save you many shift hours per day!

The Nolan Porta-Feeder has been in successful use in many mines for over two years. This modern method of moving cars has been accepted as the most efficient in the industry. Its ease of installation and quick movability recommends its use in any mine.

The Porta-Feeder mounts between the rails on top of the track ties, and is secured by jacks. No excavation or preliminary foundation work is necessary. The construction is strong and massive. There are no ropes or cables. Reciprocating pushing dogs deliver constant forward feeding motion. We will be glad to show you a mine in your vicinity where the Nolan Porta-Feeder is operating. Write us now.

THE NOLAN COMPANY 106 PENNSYLVANIA ST. BOWERSTON, OHIO

VISI-GARD

TROLLEY GUARD (Vinyl plastic)

★ Bright Yellow!! Tough!
★★ Shaped Right to Hang Right!
★★★ Will Not Support Flame!
For Sale Through Dealers

GUYAN MACHINERY CO., Logan, W. Va.

dent, succeeding Morgan Ramsay, who has retired due to ill health but will continue on the board of directors and serve in an official advisory capacity. Mr. Hawkins joined the company in 1928 and was named to the board in 1943, becoming secretary-treasurer in 1947. He will continue to hold the office of treasurer.

General Cable Buys Press For New-Type Cable Sheathing

Plans of the General Cable Corp. to provide industry in the United States with this country's first direct-extruded aluminum-sheathed cables, which are said to have advantages of lower cost, lighter weight and more strength over cables sheathed with lead or by other aluminum sheathing methods, have been announced by Irving T. Bennett, chairman of the board, and J. R. MacDonald, president. General Cable is purchasing a German-made aluminum sheathing press and will install it in one of its plants in the east. "We plan to undertake development programs leading to the production of many new products in which aluminum will be employed not only for a protective covering but also will serve other uses," the company officials reported. They also predicted that the process might make possible new designs of very high voltage overhead power cables, lighter communication cables for aerial installations, improved television (coaxial) cables, and, quite possibly, longer spans.

New G-E Departments

The formation of two new General Electric organizations, a meter department and an instrument department, has been announced as an additional step in the company's decentralization program, dividing the former meter and instrument department into two separate units. C. Howard Black, formerly general manager of the meter and instrument department, has been named general manager of the new instrument department, which will remain at Lynn, Mass., while D. E. Craig, previously manager of the Somersworth plant, has been appointed general manager of the new meter department, which will be headquartered at Somersworth, N. H.

Bemis Bro. Advances Lahey

R. W. Lahey Jr., has been appointed sales manager of Bemis Bro. Bag Co.'s Norfolk plant and sales division. Mr. Lahey joined Bemis in 1946, was assistant superintendent at Norfolk and did various types of sales work, serving as a multiwall paper-bag specialist prior to his new appointment.

New J&L Research Center

Construction has been started on Jones & Laughlin Steel Corp.'s new $1,500,000 research center as a "step in the expansion and centralization of J&L research activities." The laboratory, to be completed in mid-1955, will be located on a site overlooking J&L's Pittsburgh works and will consist of several buildings housing a research staff of about 100. The more theoretical as-

BOWDIL

COAL CUTTER CHAIN and BITS

ONE-PIECE BIT HOLDER

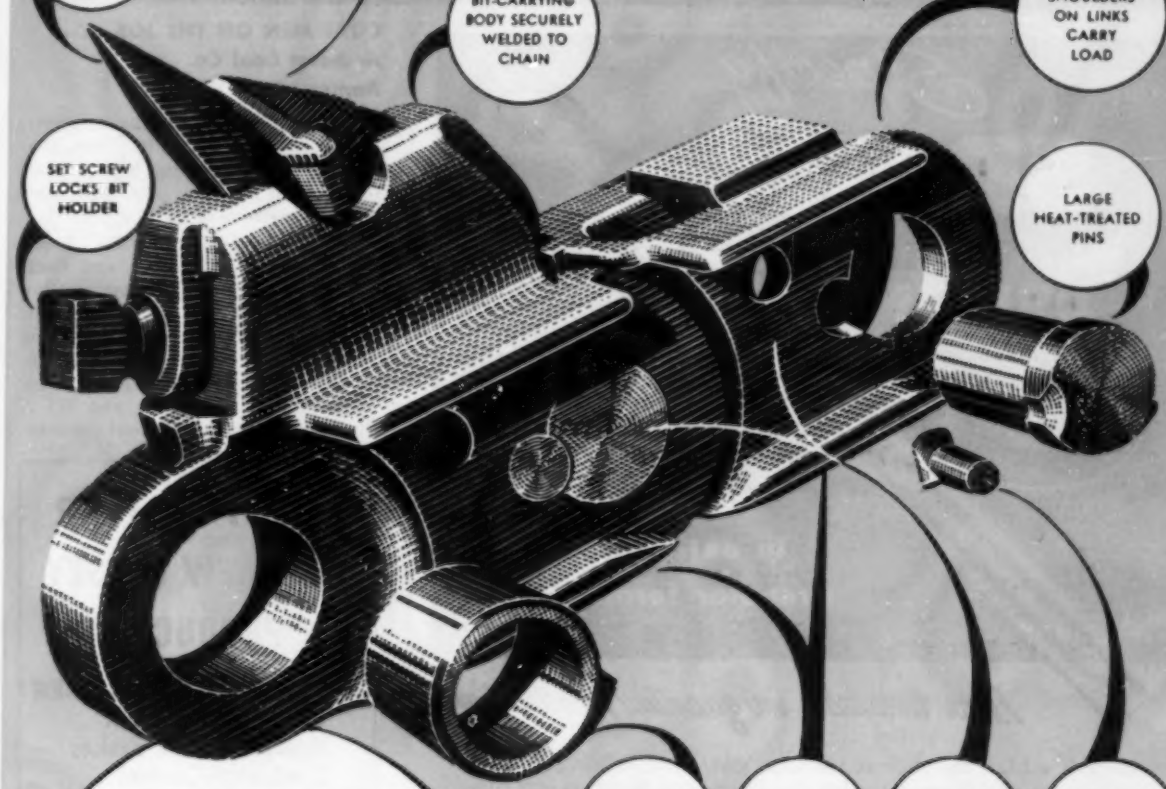
BOWDIL BITS

BIT-CARRYING BODY SECURELY WELDED TO CHAIN

HEAVY SHOULDERS ON LINKS CARRY LOAD

SET SCREW LOCKS BIT HOLDER

LARGE HEAT-TREATED PINS



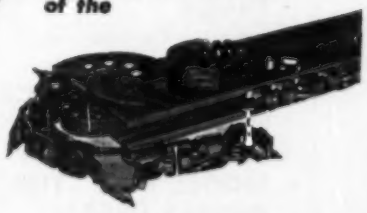
HEAVY-WALL HARDENED BUSHING

RADIAL TRACK GUIDES

DROP-FORGED LINK AND CONNECTOR

INGENIOUS RIVET LOCK

Made by the makers of the



STRONGEST CUTTER-BAR IN THE COAL INDUSTRY

BOWDIL BITS
for lowest cost per ton

THE BOWDIL COMPANY
CANTON, OHIO

COAL MEN ON THE JOB . . .
Amherst Coal Co.
Amherstdale, W. Va.

LEFT PHOTO—Wandell Bailey (left), section foreman, and J. B. White, general mine foreman, Mine No. 1-C; and D. Jackson, company electrical and mechanical inspector.

RIGHT PHOTO—Clarence Sias (seated, left), section foreman, and Cecil Edwards, general mine foreman, Mine No. 1-A; Matt Morris, mining engineer, Mines Nos. 1-A and 1-C; Earl Zornes (standing, left), chief electrician, Mines 1-A and 1-C; H. W. Burton, section foreman, Mine 1-A; and H. T. Brewster, company industrial engineer.

Specify
SPANG
MOLLOY
DRILLING BITS

for faster, lower-cost penetration in extra hard or irregular formations

Now available in quantity production

Here is a high molybdenum silicon alloy steel drilling bit that will cut its way through the hardest formations faster, at less cost per foot, and with fewer dressings, than the conventional carbon steel bit used in ordinary drilling practice. The SPANG MOLLOY BIT is a *special* alloy bit, completely heat treated, with higher strength in the blade section and greater pin strength. Because of its deep penetrating hardness, it resists abrasion and battering under the severest drilling conditions. Its use is recommended where ordinary bits are ineffective.

Unlike most high alloy bits, SPANG MOLLOY BITS can be field dressed and tempered by following practices similar to those for carbon steel bits.

When you encounter formations that slow you down and skyrocket costs, ask your Dealer for SPANG MOLLOY BITS—"The Red Bit with the Yellow Collar."

For complete information on MOLLOY BITS and FREE CATALOG of other SPANG CABLE TOOLS, consult your nearest SPANG DEALER or write direct to:

The Spang Standard

SPANG & COMPANY

Dept. M-1 • BUTLER, PENNSYLVANIA

For over 60 years Manufacturers of Spang Weldless Jars and a Complete Line of Cable System Drilling and Fishing Tools for Oil and Gas Wells, Water Wells, Prospect Drilling and Shot Blast Holes.

WATCH FOR
***These NEW* KERSEY PRODUCTS**

- **MODEL 444-D RUBBER TIRED TRACTOR**
  Hydraulic Disc Brakes — Contactor Control
- **MODEL UT-4 UTILITY TRUCK**
  General Purpose Load Carrier
- **MODEL MT-6 TRUCK**
  FOR HAULING
  Short Wall Machines
- **MODEL PC-3 "THE BOSSES DREAM"**
  Rubber Tired Personnel Carrier

KERSEY MFG. CO.
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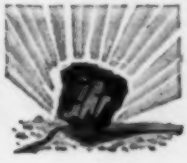
BLUEFIELD, VIRGINIA
Phone 4228

THE GREATEST NAME IN ELECTRICAL WIRE AND CABLE

New! Improved! SUPER SERVICE
heavy duty portable cords and cables

...better
impact and crush resistance



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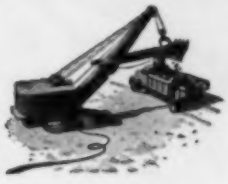
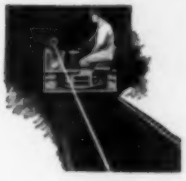
tear resistance



...better
abrasion resistance
and tensile strength



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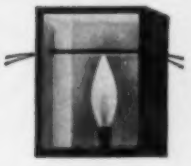
flexing endurance

...better
resistance to kinking



...better
flame and heat resistance

...resists all your costliest hazards far beyond accepted field requirements!

BARE, WEATHERPROOF, INSULATED WIRES
and CABLES FOR EVERY ELECTRICAL PURPOSE

New SUPERTUF, General Cable's lead cured jacket on *new* SUPER SERVICE eliminates ply separation, resists crushing, tearing and abrasion. Special cord reinforcement within the SUPERTUF jacket gives extra tensile strength and longer cable life. In addition to meeting IPCEA specifications the new lead cured construction provides positive embossed product identification.

THERMAX heat resistant insulation gives top protection against temporary current overloads and extends the operating life of the cable. Flame resistance of the new SUPER SERVICE cable far exceeds requirements of the Federal Bureau of Mines.

New, more compact design prevents sleeving of the core from the jacket. Result: a well balanced product that performs better, lasts a lot longer, needs less replacement...costs no more! Why settle for less? See your friendly General Cable Representative today!

GENERAL CABLE CORPORATION

420 Lexington Ave., N. Y. 17, N. Y. • Sales Offices: Atlanta • Buffalo • Cambridge (Mass.) Chicago • Cleveland • Dallas • Detroit • Greensboro (N. C.) • Houston • Indianapolis Kansas City • Los Angeles • Memphis • Milwaukee • Minneapolis • New York • Newark (N. J.) • Philadelphia • Pittsburgh • Portland (Ore.) • Rome (N. Y.) • Rossmoyne (Ohio) (Cincinnati area) • St. Louis • San Francisco • Seattle • Syracuse • Tulsa • Washington, D. C.

MODERN MINING *demands* PROTECTED CABLES

Mine operators everywhere are turning to modern improved methods to step-up their efficiency and production. And in all cases this means greater electrification: with portable power centers, junction and distribution facilities, continuous mining machines, high capacity loading and drilling equipment, etc.

Ruberoid Insulating Tape can insure more economical operation of this equipment by providing complete protection for electrical cables. Ruberoid Insulating Tape strengthens cables with a vise-like grip so that you can drag them anywhere with complete safety . . . through acid pools and over jagged surfaces. Check these seven cost-cutting features of Ruberoid Insulating Tape to assure longer life for your cables:

- Double grip . . . both sides adhesive
- Great tensile strength . . . tough
- Won't tear, ravel or pucker
- Resists abrasion
- Acid- and alkali-proof
- Extra thick . . . one layer insulates

Exceeds A.S.T.M. specifications by 40% in adhesiveness, 25% in tensile strength, 110% in dielectric strength.

* * *

For further information write The Ruberoid Co., 500 Fifth Avenue, New York 36, N. Y.

The RUBEROID Co.

ASPHALT AND ASBESTOS BUILDING MATERIALS

pects of J&L's research will be moved into the new location. Research at most of the existing locations will be continued—metallurgical research at the Pittsburgh works, coal and coke research at Aliquippa works, and ore research at Negaunee, Mich.

And For Your Information . . .

The largest distribution center of The B. F. Goodrich Co. anywhere in the world was recently opened in Columbus, Ohio. Consisting of 200,000 sq ft of floor space, the new one-story building on a 10-acre tract also houses the district offices of the company's tire and equipment, and industrial products divisions. The warehousing section has space for the storage of some 750,000 tires of all types, large stocks of conveyor and transmission belting, hose and other products of the company. The Columbus center makes possible overnight delivery of orders to parts of Pennsylvania, Ohio, West Virginia, Indiana and Michigan, the company reports.

Edward J. Goett has been appointed director of the newly-created commercial development department of the Atlas Powder Co., Wilmington, Del. Mr. Goett formerly was manager of sales development for the Charles Pfizer Co.

The appointment of Merlyn E. Schlenker to its Chicago sales engineering staff has been announced by the Reliance Electric & Engineering Co., Cleveland.

New dealers appointed to sell and service the Michigan line of excavator-cranes and tractor shovels, products of the Construction Machinery Div. of Clark Equipment Co., include: Highway Equipment Company, Inc., Pittsburgh, Pa.; Cox Brothers, Hoopeston, Ill.; and Phillips Machinery Company, Richmond, Va.

Industrial Engineering & Construction Co., Inc., Fairmont, W. Va., has announced the moving of its engineering office from the 711 Penn Avenue Bldg., Pittsburgh, to Room 1505-07, Keenan Bldg., 643 Liberty Ave., Pittsburgh 22, Pa.

Brad Foote Gear Works, Inc., Cicero, Ill., has appointed Harry Boyer, La Jolla, Calif., as representative in West Coast and Rocky Mountain states. The appointment is the latest under a new general sales plan which makes available to customers the combined sales and engineering staffs of the company and its two subsidiaries, the Pittsburgh Gear Co. and the American Gear & Mfg. Co. Manufacturing facilities include three plants with a combined floor space of 225,000 sq ft, devoted exclusively to the complete manufacture and heat-treatment of gears and gear products.

Brunner & Lay products are now available for immediate shipment to customers in the Pacific Northwest through the Westland Equipment Co. Included are complete stocks of all Brunner & Lay pneumatic tool accessories, carbide Rok-Bits and Westland drill steel. Irving H. Rauw is general manager in charge

Bottom-Dump Coal Haulers have capacities of 25, 32 and 40 tons . . . engines from 190 to 300 h.p. . . . dual or large single drive and trailer tires . . . torque converter and Torqmatic drive or standard transmission.

EUCLID DIVISION
GENERAL MOTORS CORPORATION
Cleveland 17, Ohio

Higher Availability
More Tonnage
Lower Costs

On scores of mining operations all over the world the high job availability of Euclid equipment results in more tons hauled per shift. Because they're engineered and built for the toughest off-the-highway service, "Eucs" stay on the job longer, with less time out for servicing and repairs.

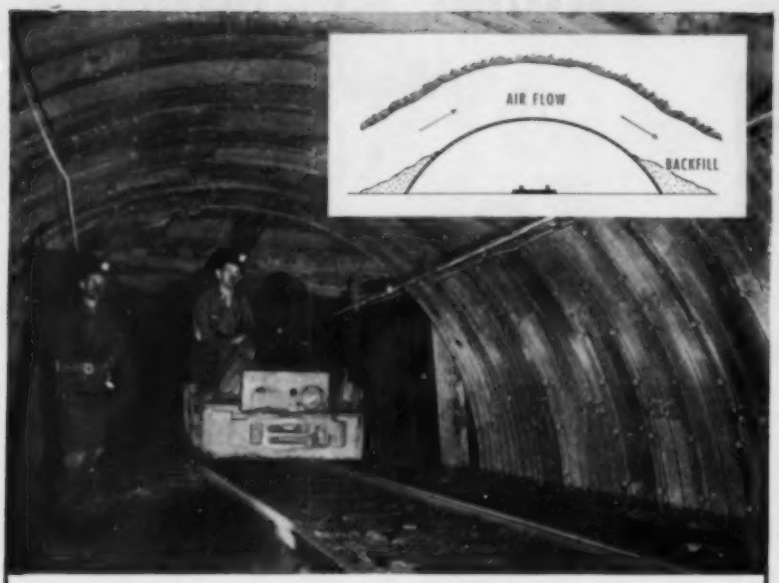
Dependable low cost hauling has made Euclid the preferred equipment for open pit operations in both the bituminous and anthracite fields. If you're interested in cutting your hauling cost for coal, overburden or waste, have your Euclid distributor prepare a production and cost estimate for your operation. There's a good chance he can show you how to haul more tonnage at lower cost.

Rear-Dump models are available in 10, 15, 22, 34 and 50 ton capacities with engines of 165 to 600 h.p. . . . semi-rigid or spring mounted drive axles . . . standard transmissions or torque converters and Torqmatic drive.

Euclid Equipment

FOR MOVING EARTH ROCK COAL AND ORE

GM GENERAL MOTORS



You can move this overcast wherever it's needed

An overcast of Armco Liner Plate construction need never be abandoned. When changing conditions or new operations bypass the original location, it's a simple matter to dismantle your Liner Plate structure and erect it again where you need it. You can move it over and over without loss of material.

The unique design of Armco Liner Plate saves you metal—and money, too. Since the corrugations extend *through* the longitudinal joints, lighter gage metal can be used without any sacrifice in strength. Individual plates are light enough for one or two men to carry, hold and bolt in place. Regular maintenance crews can do the job without any special training.

Armco Liner Plates are available in a wide range of sizes and gages for round and elliptical shapes as well as arches. They provide low-cost answers to many mining problems such as bins, shafts, entries, and tunnels. Write for complete data. Armco Drainage & Metal Products, Inc., 2194 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. Export: The Armco International Corporation.

ARMCO
LINER PLATES

ARMCO

EQUIPMENT APPROVALS

Five approvals of permissible equipment were issued by the U. S. Bureau of Mines in June, as follows:

Goodman Mfg. Co.—Type 670-10 cable-reel shuttle car; three 10-hp motors, 250 v, DC; Approval 2-1000; June 2.

Goodman Mfg. Co.—Type 670-11 cable-reel shuttle car; three 10-hp motors, 250 v, DC; Approval 2-1001; June 2.

Acme Machinery Co.—Model HSJ drill truck; 10-hp motor, 250 v, DC; Approval 2-1002; June 2.

The Long Co.—Model 88 loading machine; 25hp motor, 230 v, DC; Approval 2-1003; June 15.

Joy Mfg. Co.—Types 6SC2PE-3 and 6SC2PXE-3 cable-reel shuttle cars; three 7½-hp motors, 250 v, DC; Approval 2-1004; June 25.

of Brunner & Lay Corp., Westland Div., Portland, Ore.

Locke Stove Co., Kansas City, Mo., has named the Osborne McMillan Elevator Co., Minneapolis, as a wholesale distributor for "Warm Morning" coal heaters in western Wisconsin, Minnesota, the Dakotas, and Montana. The new distributor, which operates a number of coal handling stations throughout the Northwest, will cooperate closely with coal merchants and the Northwestern Retail Coal Dealers' Association in promoting increased sales of Warm Morning coal heaters in that area. A trend toward renewed public acceptance of coal heating stoves is indicated by its shipments of Warm Morning coal heaters for the first 4 mo of 1954, which were substantially ahead of last year, Locke Stove reports.

A new engineering test building offering four times as much space as previously available has been put into operation by Chevrolet at the General Motors proving ground. The recently completed structure, according to the company, gives an expanded engineering staff the most modern equipment of its kind and will expedite appreciably Chevrolet's analysis of results of 1,500,000 test miles a year. Among the features of the new facility are a room in which motionless air permits absolute temperature control to plus or minus 1 deg and a bed plate for measuring vehicle heights to 30,000th of an inch.

D. F. McCandlish, manager of the Air Reduction Sales Co. district office in Chicago, has been appointed regional manager of the north central region in Chicago, succeeding S. H. Newburn who was recently appointed president of Air Reduction Canada, Ltd. S. S. Bruce Jr., zone manager, eastern region, Air Reduction's railroad department, has succeeded Mr. McCandlish as Chicago district manager.

St. Paul Hydraulic Hoist has completed the move of its sales and service functions, covering both domestic and

JUMBOLTER

installs roof bolts three times faster

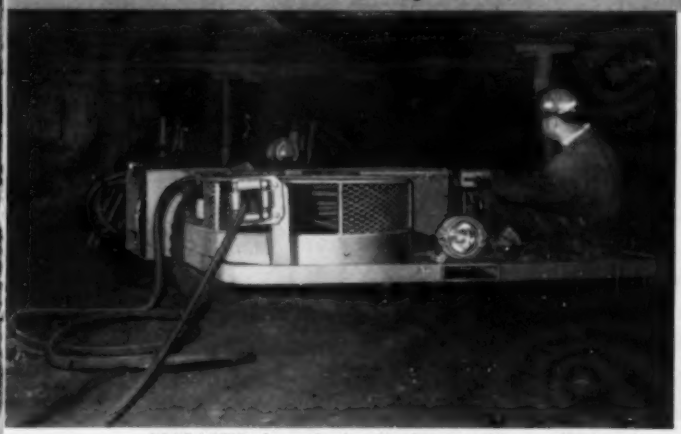
Acme's Stoper Jumbolter is the mine operator's biggest time and money saver since the first stoper. Typical performance: With Jumbolter, two men can complete in 15 minutes a job that used to take three men with hand stopers 45 minutes. Another mine operator reports 210 42" roof bolts installed in one 6½ hour shift with Jumbolter!

With the stretch of an octopus, Jumbolter's air-articulated arms reach out 9 feet, swing in 270° arc . . . bolt an area 23' 10" wide without moving machine.

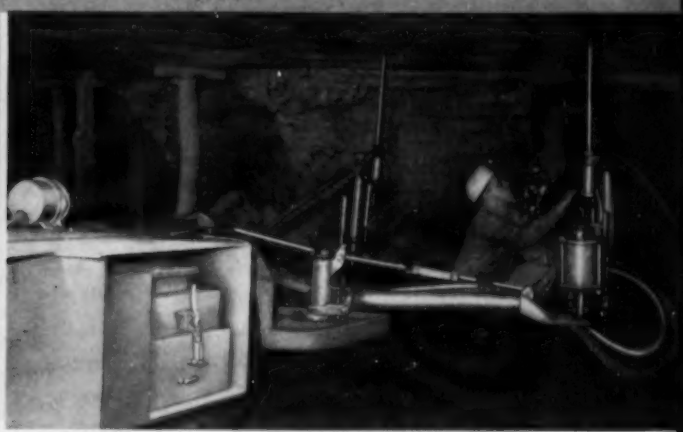
Jumbolter's performance figures show how roofbolting can be the fastest part of the mining cycle, how tonnage is increased and cost-per-ton lowered.

Revolutionary new dust collectors

Jumbolters are equipped with LeRoi-Cleveland stopers which feature new tube-type, suction dust collectors approved by the Bureau of Mines. They save time . . . are easy to service. No jacks or arms to set up — no separate units required.



REAR VIEW shows hydraulic-driven cable reel, hydraulic tramming and steering controls. Operator has ample deck room (42" x 42').



SIDE VIEW shows easily positioned stoper arms. Storage space is provided for 150-200 bolts, nuts and plates.

Write or call today for details on how Jumbolter can triple your roofbolting production.

BUREAU OF MINES APPROVED!

Jumbolter has Bureau of Mines Approval Number 2-1002. Overall height of 30" permits bolting of 36" ceilings. Telescoping stopers can bolt 9 foot ceilings. Adapt the LeRoi-Cleveland stopers you now use to the new dust collecting system with a conversion kit. Jumbolter is 178" long, 88½" wide . . . ground clearance is adjustable from 6 to 9".

ACME Machinery Company

WILLIAMSON, WEST VIRGINIA • PHONE 2274

There is a *difference* in Resistors

P-G Resistors have proved this for many years

Different, because steel and mica, both extremely durable materials, coupled with P-G exclusive design produce a resistor of great mechanical strength. There is nothing to break. With accurate resistance values and adequate carrying capacities, P-G Resistors outlast ordinary resistors. Tell us your specifications and let P-G solve your resistor problem.

For any job . . . Where constant "trouble free" resistor service is wanted . . . you can safely specify P-G Steel Grid Resistors and get better performance with low cost maintenance.

The Nonbreakable Steel Grid Resistor

P-G

THE POST-GLOVER ELECTRIC COMPANY

ESTABLISHED 1892

221 WEST THIRD STREET, CINCINNATI 2, OHIO

export activities, to its new expanded plant site in Mattoon, Ill.

The American Brake Shoe Co. has named Georg H. Morel district engineer for the construction and maintenance department in the Chicago area. Mr. Morel formerly was division plant engineer and safety director with the National Bearing Div., St. Louis, Mo.

William A. McMahan has been made Western district sales manager for the Carver Pump Co., Muscatine, Iowa. Mr. McMahan previously was associated with Carver Pump in sales work but left to serve in the Navy where he was commissioned a commander.

The St. Louis headquarters of Leschen Wire Rope Div., H. K. Porter Co., Inc., has moved to its new general office at 2727 Hamilton Ave., around the corner from the old location.

Stripping Banned in West Virginia Forests

Circuit Court Judge W. M. Watkins recently ruled that a strip-mine operator may not mine coal from a seam lying beneath the Kumbrabow State Forest, in West Virginia. State Conservation Director Carl J. Johnson declared the decision is especially significant because the state owns mineral rights for only 60% of the state's 200,000 acres of parks and forests. The operator involved in the case was D. S. Blount, Roanoke, Va., who proposed to strip 45 to 90 acres in the forest.

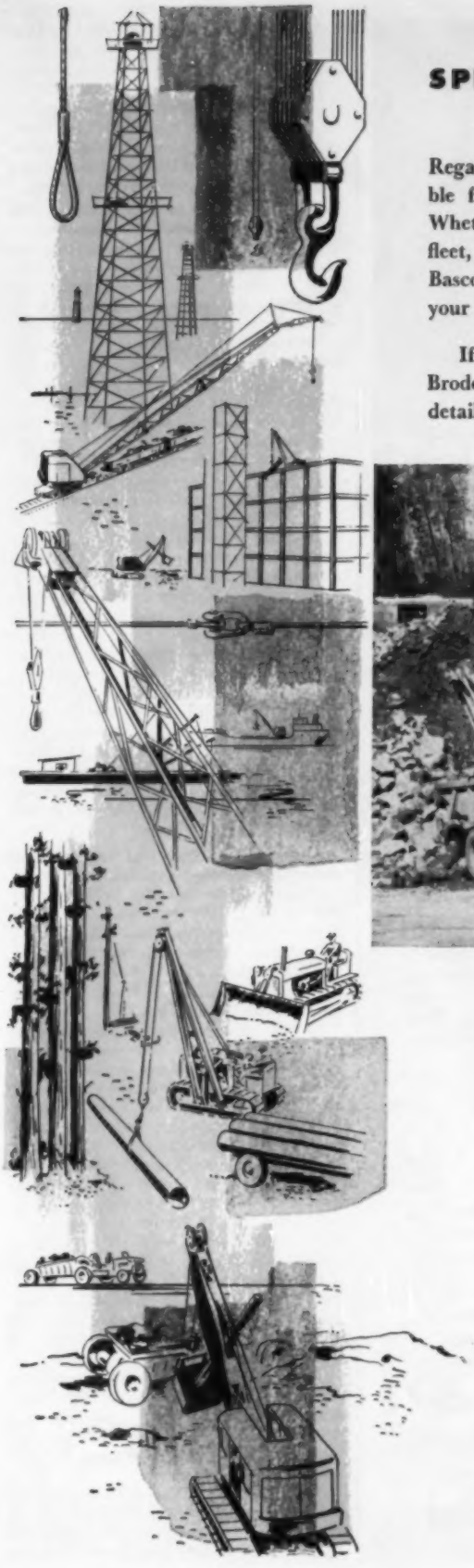
USBM Reports on Mine Fires

The Bureau of Mines has investigated 47 fires in underground coal mines since July 1, 1952, according to recent announcement by Secretary of the Interior Douglas McKay. Of these, 34 were in eastern fields, 7 in the Midwest, 5 in the Rocky Mountain region and 1 in Alaska. Five of the fires caused death to five men and injury to 18. Warning that the low casualty rate should not blind operators to the danger of fire, J. J. Forbes, USBM director, urged proper pre-shift and on-shift examinations; adequate, well-maintained fire-fighting equipment; predetermined fire-fighting procedures and trained men; proper installation and maintenance of electrical facilities; availability of rockdust, water and chemicals; prompt reporting of fires; and strict compliance with provisions of the Federal Coal Mine Safety Act and the Code.

Mine Inspectors Meet

. . . Begins on p 128

West Virginia production came from roof-bolted mines. The most recent fatality in West Virginia attributable to bolt failure occurred in June, 1952, Mr. Houck said. In a brief review of roof-bolting progress, Mr. Houck told of the change from early wedge-type bolts to the expansion-shell bolts now used in 95% of the West Virginia applications. Also, the change from percussion drilling to rotary



SPEEDI-SERVICE IS FOR ALL WIRE ROPE USERS!

Regardless of the amount of wire rope you use, you're eligible for the money-saving advantages of Speedi-Service. Whether you have a 2-ton hoist or a 100-unit earthmoving fleet, you can register your needs with your Broderick & Bascom distributor. Then, when replacement is needed, your rope will be ready in minutes instead of hours.

If you're not already saving time and money, call your Broderick & Bascom distributor and ask him to explain details of the Yellow Strand Speedi-Service!

THIS IS SPEEDI-SERVICE . . .

The wire rope requirements of your equipment are registered on permanent record cards by your Broderick & Bascom distributor. When a rope is needed, call your distributor and tell him what machine needs what line. He'll consult his records to determine what length, type, construction and grade of rope is needed. The correct rope will be taken from stocks controlled by your records and will be ready for you in a matter of minutes.

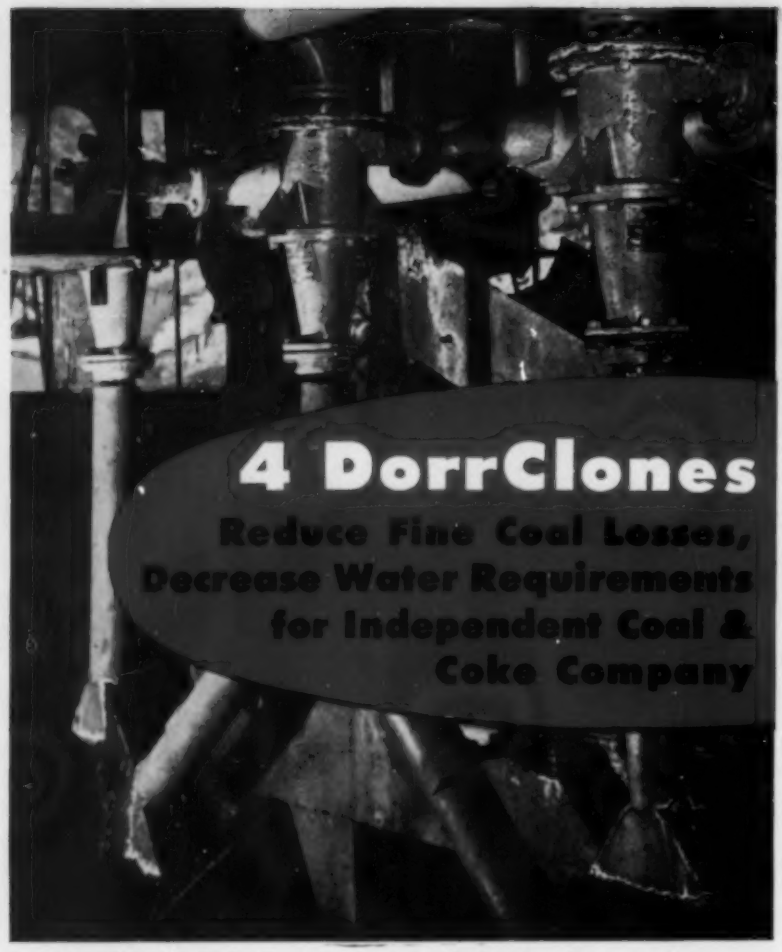
You eliminate costly record keeping, big stocks and downtime. You make money on the long run of precision-built Yellow Strand Wire Rope!

BRODERICK & BASCOM ROPE CO.
4203 Union Blvd. St. Louis 15, Mo.

Specify

Yellow Strand®

For Savings . . . Safety . . . Speedi-Service



Battery of three 6" dia. DorrClones dewatering underflow from secondary cone.

Here are two good examples of the DorrClone's ability to improve coal washing flowsheets . . . both at the same plant of Independent Coal and Coke Company in Utah. Problems were recovery of fine coal losses and dewatering of cone underflow prior to drying. Producer installed one 12" dia. DorrClone and three 6" dia. DorrClones equipped with wear resistant liners.

Here are the results:

1. Recovery of 8 additional tons of fine coal per hour.
2. 75% reduction in volume of water to waste.
3. 30% decrease in process water requirements.

These results are typical . . . concrete proof of the savings you can realize with these low cost units. What's more, DorrClones can now be supplied with the special Type CB liner which solves the serious wear problem encountered in washing plants. We'd like to tell you more about how DorrClones can be used in your flowsheet. Just drop a line to The Dorr Company, Stamford, Conn.

DorrClone is a trademark of The Dorr Company Reg. U. S. Pat. Off.

FIFTY YEARS 1904-1954

Better tools TODAY to meet tomorrow's demand

DORR

WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

THE DORR COMPANY • ENGINEERS • STAMFORD, CONN.
Offices, Associated Companies or Representatives in principal cities of the world.

drilling provided safety benefits in that kettle-bottoms and other roof inclusions are less disturbed by the rotary methods.

Roof plates also have been greatly modified, with smaller ones proving just as effective as the large ones first used, and shorter bolts have become popular with the realization that good anchorage is to be preferred over extreme length.

On the subject of roof control with conventional timbers, Mr. Cunningham declared that even now in setting up standard timbering plans too much reliance is placed upon the judgment of supervisors and workers, and results have been disappointing. In approved roof-bolting plans; such on-the-spot judgment is reduced to an absolute minimum because of their stringent requirements. Why should not timbered roof be given like or stricter consideration, Mr. Cunningham asked. Attributing a roof-fall accident to an "error in judgment," therefore, appears to be merely a less-caustic way of saying insufficient timbering.

In far too many instances officials fail to investigate unsafe practices or lost-time injuries, Mr. Cunningham said, although the record shows that in companies where complete investigations are the rule, safety performance generally is excellent. Each mine official has a legal and moral responsibility to preserve life, and the fulfillment of this responsibility may require the discharge of those who commit infractions of timbering rules, Mr. Cunningham said, in explaining that the intent of this provision of the bituminous mining laws of Pennsylvania is not punitive—it is to protect the person who will not or cannot follow timbering requirements.

Although ¾-in bolts and 6x6x⅝-in roof plates now are most popular, experiments are underway to test the holding qualities of ⅝-in bolts and ¾-in plates, Mr. Fear said, in pointing out that a ⅝-in bolt of high-tensile steel can be made to equal the present ¾-in bolt in holding power. Thus, savings of from 12 to 15¢ per bolt may be realized.

At one mine, working the 8½-ft Pittsburgh seam, 15 in of top coal is left in place and 60-in bolts are used, Mr. Fear said, in describing a specific example of roof-bolting performance. Entries are 16 ft wide and cross cuts and pillar workings are 14 ft wide. Bolts are installed on 4-ft centers, both ways, and 2x8-in by 12-ft oak timbers are bolted up at intersections. In pinpointing performance at this mine, Mr. Fear reported that with percussion drills four men were required to drill and bolt from 18 to 22 places per shift and another driller was required on coal. A change to rotary drilling was made, however, and now two men drill and bolt the same number of places and also drill the coal.

As to safety, Mr. Fear said that bolting was started in one area of Pittsburgh-seam coal on Jan. 7, 1952, and since that time 1,270,518 tons of coal have been mined without a bolt failure and without a fatality.

Mr. Fear noted a need for some reliable, low-cost method of checking or regulating bolt tension during installation. Coated shin plasters have been tried but

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● Truck Mounted Horizontal McCarthy Drills are breaking drilling records everywhere! All necessary equipment is carried with the unit — out of the mud at working level!

● McCarthy Coal Recovery Drills are revolutionizing both deep and strip mine operations. As the auger moves in, steady streams of clean coal are pulled out without touching the overburden. Average daily output ranges from 15 to 50 tons per man per shift. Many models are available. The machine illustrated above is equipped with a 36-inch auger, retriever, hoist and Lump Drill Head.

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Instant-action control selects any speed up to 5 feet per minute.

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Determines rotating speed of auger.

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it is impossible to maintain a 90-deg relation between washer and bolt, thus ruling this one out. Another attempt consisted of bonding a layer of rubber between two washers so that as the bolt is tightened the rubber is extruded, the amount of extrusion indicating the tension on the bolt. However, the cost of the device was too high for universal application.

Speakers and their subjects at the final session Wednesday afternoon were: John Nagy, chief, coal-mine experiments section, U. S. Bureau of Mines, Pittsburgh, presenting results of an investigation into dust-sampling methods; W. E. Bearce, mechanical engineer, Hanna Coal Co., St. Clairsville, Ohio, on control of dust hazards at tipples and cleaning plants; W. S. McAleer, vice president, McNally Pittsburg Mfg Corp., Pittsburgh, in a discussion of Mr. Bearce's paper; W. B. Jamison, vice president—operations, Jamison Coal & Coke Co., Greensburg, Pa., on the present status of gas storage under coal measures; and G. R. Higinbotham, president, Consolidation Coal Co., (W. Va.), Div. of Pittsburgh Consolidation Coal Co., Fairmont, W. Va., discussing Mr. Jamison's paper. H. J. Dusz, chief, Ohio Div. of Mines, presided.

DUST SAMPLING AND CONTROL

Taking note of the many problems that have arisen bearing on rock-dust requirements, practices and sampling procedures, Mr. Nagy, in presenting a paper prepared jointly with Irving Hartmann, chief, dust explosions and coal-mine experiments branch, USBM, Pittsburgh, described Bruceton studies which were carried through with the aims of (1) comparing floor samples against roof-rib samples, (2) determining the effectiveness of band samples as substitutes for separate floor and roof-rib samples, (3) estimating the number of samples required for analysis and (4) looking into the possibility of rating incombustible content by underground color sorting.

Basing his conclusions upon analyses of 417 samples from an Indiana mine (No. 5 seam) and 108 samples from four Pennsylvania mines, Mr. Nagy reported that roof-rib samples contain somewhat higher proportions of incombustible material than do floor samples. Owing to the much greater quantity of floor dust, Mr. Nagy said, virtually no rock-dust deficiency in the floor dust can be tolerated if adequate protection against strong explosions is to be provided.

In determining whether band samples might be substituted for separate floor and roof-rib samples, Mr. Nagy reported that band samples generally show a slightly higher incombustible content than the floor sample, but the difference appears to be constant within reasonable limits. The Bureau of Mines has recently adopted band-sampling in place of separate road and roof-rib samples. As to the number of samples required, the minimum is greater than the number which can possibly be taken during a normal mine inspection, suggesting that operating personnel should, if possible, collect and rate supplementary samples at frequent intervals. And with proper training of

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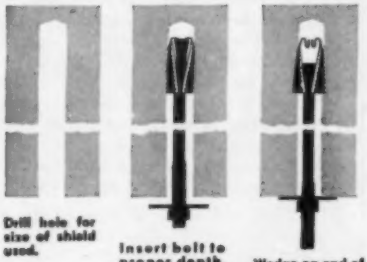
A Safer, Stronger Method of Roof Bolting

Republic's New Wedge Head Roof Bolt has undergone extensive tests in both coal and ore mines for over a year. It is a safe and sure method of roof bolting. The bolt cannot be installed unless securely anchored.

Wedge Head Features:

1. Hot forged to resist collapse.
2. Deep, sharp serrations provide positive holding power.
3. Steep angle of wedge assures positive anchor.
4. Spot welded mild steel clips hold shields securely for positioning.
5. Shields available for 1⅜″ and 1½″ holes. Both sizes fit ¾″ bolt.

HOW TO INSTALL



Drill hole for size of shield used.

Insert bolt to proper depth. Add bearing plate and nut.

Wedge on end of bolt forces shield to grip side of hole as nut is tightened.

Bolt Shank Features:

1. Bolt is not twisted in tightening operation. This eliminates danger of twisting bolt in two and torsional stresses.
2. Full four inches of rolled threads.
3. Exposed threads below bearing plate provide a fastening point for other equipment.
4. Bolt is available in two types of steel—1020 low carbon steel for standard use and 1045 high carbon steel for extra strength.
5. Available in any specified length in ¾″ diameter size.

Republic Wedge Head Mine Roof Bolts are easily installed. Hole length need not be exact. Bolts can be reset to greater depth by drilling hole deeper than bolt length at time of original installation.

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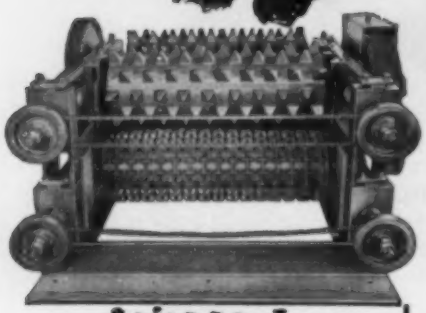

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All Gundlach crushers are equipped with Gundlach Patented Crushing Rollers (Pat. No. 2578540) and are designed so that material size can be changed while the machine is running.

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C.O.C.C.'s Personalized Service in Workmen's Compensation and Public Liability results in new high in mining efficiency . . . "tailor-made insurance" that provides engineering facilities to aid in increasing production efficiency while cutting operational costs. Accident frequencies are minimized and savings in time and equipment are increased! In addition, our prompt claims handling and effective rehabilitation of injured personnel promote harmony and productive efficiency. • Call your C. O. C. C. representative today!

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GREENSBURG, PA.

mine personnel, it may be possible to sort samples by color, thus permitting underground rejection of those containing high proportions of incombustible to relieve the work load at the laboratory, Mr. Nagy suggested.

"Since, for a whole plant, it is to be expected that the means for raising dust into an airborne cloud and the heat to ignite it will each be present occasionally, it is only a matter of time until both are present simultaneously and if inflammable dust is at hand ignition must result," Mr. Bearce stated, in stressing that safety can be assured only by eliminating accumulations of dust.

Using the Georgetown plant of the Hanna Coal Co. as an example, Mr. Bearce pointed out this can be accomplished by (1) keeping the dust in the coal stream and out of the air, (2) segregation and subsequent special handling of contaminated air (keeping dusty locations enclosed and under negative pressure) and (3) cleaning up the plant at frequent intervals to prevent dangerous dust concentrations. Such methods are reasonably effective and economical, Mr. Bearce said, but there will be some dust in the plant atmosphere some of the time. It will eventually settle out and must be cleaned, either by vacuum cleaning or by washing down.

On flash-drying installations, Mr. Bearce made the following observations:

1. Pressures developed from ignitions in drying equipment have been determined with considerable accuracy, and it should be possible to design such equipment with venting facilities and structural ruggedness sufficient to render such ignitions harmless.

2. Proper instrumentation and controls on this equipment are vital and maintenance of these controls must be carefully organized.

3. Maintenance of venting valves should be carefully done to avoid the possibility of their becoming inoperative.

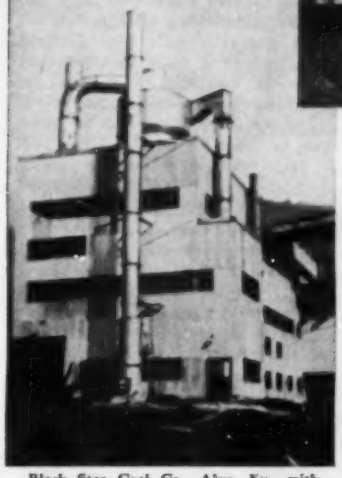
4. Venting valves should be so located as to avoid lengthy connecting ducts or other high-inertia restrictions upon the flow of gases under explosion pressures and velocities.

5. The use of combustible dust-collecting equipment should be avoided.

"The real cause of some of the explosions around cleaning plants and tipples might well be attributed to the evolution of gas rather than to dust," Mr. McAleer declared in his discussion, "and this evolution of gas might well be increased as a result of the fineness of the coal and the temperature of the coal-dust particles." For example, one large plant was designed with large storage and blending bins for both raw and clean coal and with a complete and efficient dust-collecting system. As long as the dust-collecting system was in operation, removing large volumes of air from above the bins, there was no accumulation of gas, but during idle periods a considerable amount of gas accumulated in the housing above the bins. It was necessary to install a ventilating system interlocked with the dust-collecting system, so that as soon as the collection system was shut down the ventilating system immediately

Flash Drying FINE COAL

175 tons per hour of ¼" x 0 coal dried from 8% to 2% moisture with multiple drying column in western Pennsylvania plant, at left.



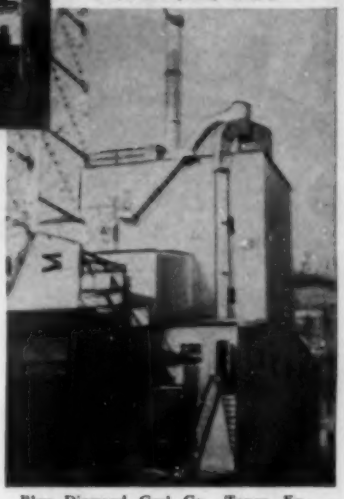
Black Star Coal Co., Alva, Ky., with single column Flash Dryer produces two grades; 45 tons per hour of ¼" x 28-mesh, and 15 tons per hour of 28-mesh coal, with final moisture content of 2%.

RAYMOND SYSTEM

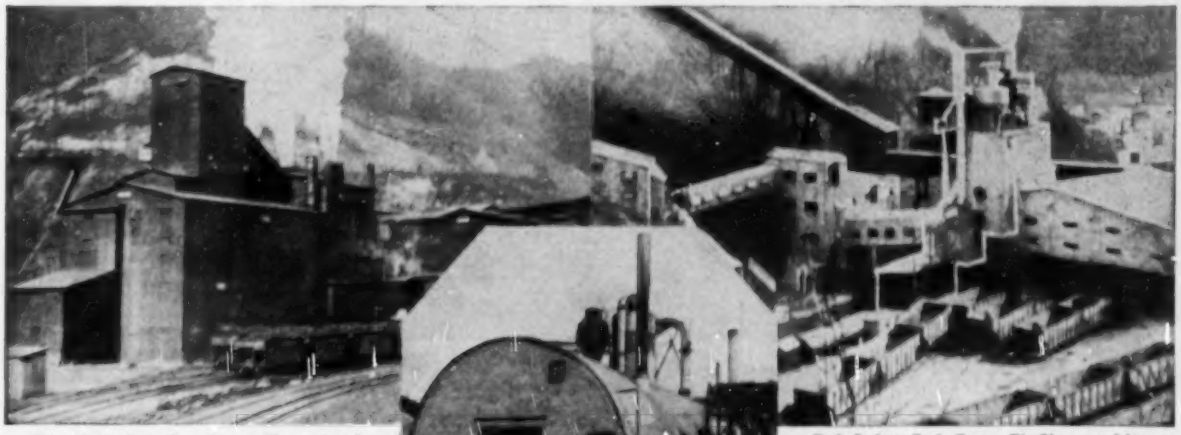
These typical installations exemplify the superior results obtained with the modern C-E Raymond System of Flash Drying. Constant developments and new advances in Flash Drying operations assure utmost efficiency in producing fine coals from ⅜" and below in particle size.

The instantaneous drying action and new type coal trap, combine to eliminate the coal degradation problem even in the softer coals. By means of a wet scrubber device, air pollution around the plant is kept well below all local ordinance restrictions.

C-E Raymond Flash Drying is simple, efficient and flexible in its application to various types of coal and in large or small capacity plants.



Blue Diamond Coal Co., Toner, Ky., sets record economies in drying ¼" x 0 fine coal from 10% to 2% final moisture content. Single column Flash Dryer has 75 tons per hour capacity.



Clinchfield Coal Co., Dante, Va., using 3-column Raymond unit handles 180 tons per hour of ¼" x 0 coal. Moisture reduced from 12-14% down to 2%. Rated capacity greatly exceeded—smooth, clean, automatic operation—low maintenance costs.

Typical small capacity Raymond unit at Kuesel Coal Company is flash drying 15 tons per hour of fine coal to less than 3% moisture.

Red Jacket Coal Corp., W. Va., pre-dries raw coal from initial 10-15% down to 2-3% final moisture. Ash reduction ranges 6% to 9%. Resultant 3/16" x 0 coal upgraded about $1.50 per ton. Lower costs, better quality, higher market.

For further details, ask for Bulletin FD-51

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SUPER-CONCRETE STAVE STORAGE BINS

was cut into service.

"While the industry in general is inclined to think of dust suppression and dust collection systems as an expensive means of eliminating nuisance and to some extent hazards," Mr. McAleer concluded, in pointing out other benefits, "the time will come when a great majority of coal operators will install such systems to increase productivity, protect health of workers, and reduce absenteeism."

UNDERGROUND GAS STORAGE

"We feel gas can and should be stored in locations where such storage will not endanger men's lives," Mr. Jamison stated, in making it plain that the coal industry does not oppose storage for economic reasons. Noting that there now are about 90 storage pools in active operation in West Virginia and Pennsylvania, Mr. Jamison listed the major hazards as the uncharted well, abandoned and improperly plugged wells, disturbance of wells in mining operations, leakage of oil and gas lines over mining operations and leakage from storage pools as a result of mechanical leaks, indefinite pool boundaries or disturbance of the cap rock.

Speaking on what can be done to permit safe co-existence of coal mining and gas storage, Mr. Jamison said: "I believe there is but one certain solution at the present time. That is, all mining operations and gas storage must be kept a number of miles apart . . . but I shall not attempt to specify what number."

The only reasonably accurate maps of a storage pool are those of the Pratt pool in Greene County, Pennsylvania, Mr. Jamison explained, and these show an extension of the limits of the pool of approximately 1½ mi in one direction. Before it would be possible to suggest a safe distance of separation, many more maps would have to be examined. Then a substantial factor of safety should be applied to take care of gas migration and leakage. The resultant distance might be shortened if the storage pool then were surrounded by a belt of vent wells drilled a certain minimum distance apart. If a vent well later showed the presence of gas, indicating migration to that point, new vent wells would have to be drilled beyond the well showing gas, or the storage pressure could be reduced to eliminate the show of gas at the vent well.

Concurring with Mr. Jamison on the safety reasons for coal's concern in the problems of gas storage, Mr. Higinbotham cited several coal-mine explosions in Pennsylvania and West Virginia attributable to gas leakage. An encouraging note is the development of natural-gas liquefaction, which could conceivably result in the obsolescence of underground storage. Such facilities can be built near points of consumption and, since the volume is 1/600th of that required for gas at standard conditions, the containing vessels can be placed at locations which present minimum danger.

Mr. Higinbotham concluded with an appeal to the mine inspectors, as a responsible group of safety-minded representatives of the coal industry, to take a serious and active interest in the subject.

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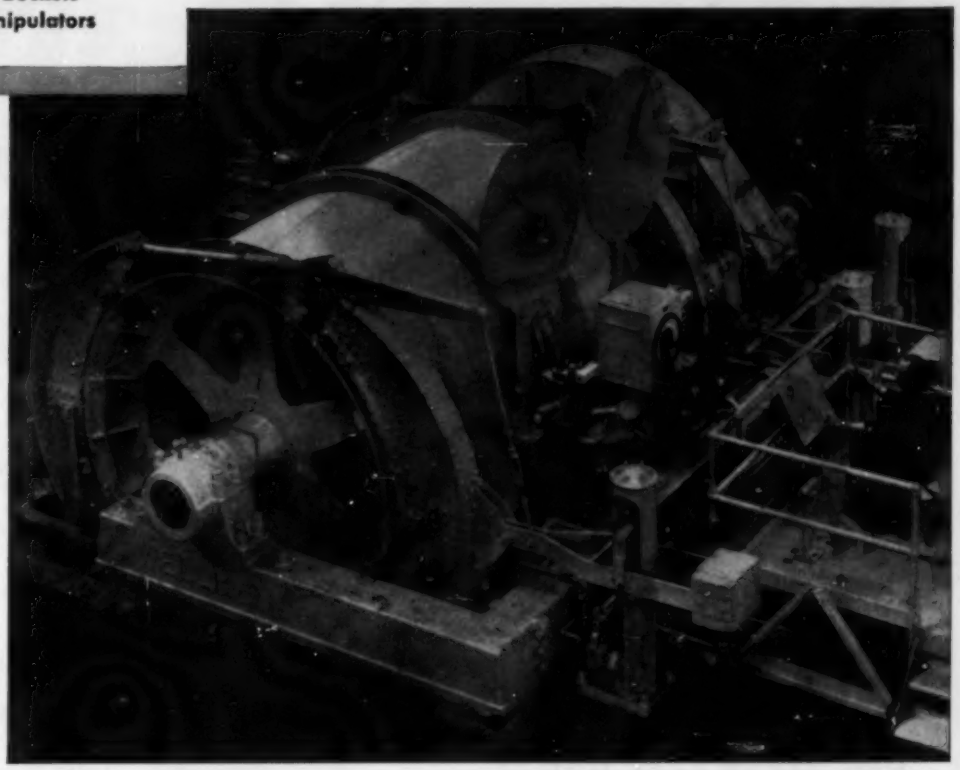

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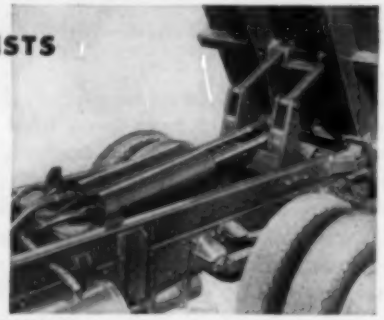

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Industrial Coal Salesmen Complete Engineering Course

Twenty-six representatives of coal producing and sales companies have completed a 2-wk engineering course for salesmen of industrial coals at Penn State University, State College, Pa. The special course, which ran from June 13 to 25, was sponsored by the American Coal Sales Association, which originated the program in 1953 at Penn State and Purdue Universities. The course covered all phases of utilization and combustion of coal and competitive fuels, including properties and analyses of coals; all types of fuel-burning equipment; controls and instrumentation; fuel-performance testing; coal handling and storage; ash handling; and air cleanliness.

Instructors in the course were Professors T. S. Spicer, R. G. Grace, F. A. Axelson, T. S. Polansky and P. L. Walker Jr.

Will Resume Underground Gasification in Alabama

Tests in underground gasification of coal are expected to start up again soon following three-way agreement in June involving Alabama Power Co., Stanolind Oil Co. and the U. S. Bureau of Mines. Experiments will be on a limited basis pending approval by Congress of a $256,000 appropriation to the Bureau. New procedures will call for pumping petroleum jelly into the coal seam, subjecting it to high pressure and igniting it with a thermite bomb. This method, used by Stanolind to shatter dense oil-bearing strata and increase the flow of oil, may speed the flow of gases through fissures in the coal seam.

Rocky Mountain Meeting

. . . Begins on p 124

ingly are doing a great disservice to our country. Again, I call attention to the ballot box where free men can make a free choice of those who will properly represent their views."

Unfair Competition, Robert E. Lee Hall, general counsel, NCA—Speaking from the legal standpoint, Mr. Hall termed private hydro power the least unfair of coal's competitors, though even it has the advantages of protected markets and rates—privileges not available to coal. Government-subsidized hydro is definitely unfair; domestic natural gas is considered as a "favorite son" and enjoys protection in markets and rates; and imported residual is definitely the most unfair of all coal's competition.

Some progress has been made but some setbacks have been experienced also, Mr. Hall observed, and there is a real fight still ahead. Legislation to correct unfair situations is one avenue to relief, and here the need is for votes in addition to a consciousness of right. The industry must develop a coordinated, concerted program and keep plugging it to restore coal to its rightful place. Perhaps the overall solution is accelerated

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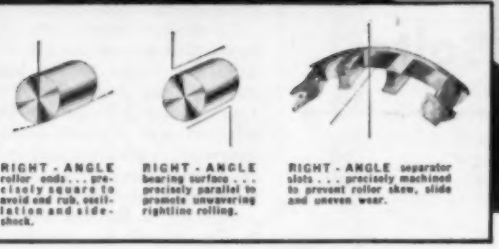
Because every surface is precisely square . . . precisely parallel. No skew . . . No skid . . . No oscillation



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New West Virginia expansion sleeve roof bolts are designed for quicker tightening, increased holding power. Deeper, angular teeth have larger biting area. Shell finger extension over bolt end provides initial anchorage without the use of ears or pal nuts on bolt; permits plug to be pulled down, expanding flexible fingers. These advantages make bolting a safer, faster part of mining cycle.

Wedge-type or expansion sleeve roof bolts available in all lengths. Threads waterproof-wrapped and spray-protected from rust. Write for latest roof bolting literature.

New, Improved

West Virginia Roof Bolts

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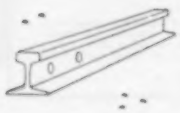
Furnished from eight to sixty pounds in any lengths. Usually available for immediate shipment.



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evolution of a national fuels policy as the best means of enabling coal to live and serve the Nation more effectively in the future.

Management Manpower, Albert M. Keenan, president, Thompson Creek Coal & Coke Co., Denver, and head, coal-mining department, Colorado School of Mines—In considering coal's future, is there need to worry about that future if we neglect to train executives to manage the industry properly and carry it into that future in shape to take advantage of its opportunities? Today, this is more of a problem than ever before, and the need is not only for technical excellence but for men propery prepared to work up to managerial responsibilities. This involves preparing them, among other things, to deal with men—a skill sadly lacking in most young men today, along with a desire to buckle down and earn advancement.

Marketing, A. B. Foulger, vice president, Lion Coal Corp., Ogden, Utah—It should not be forgotten that marketing is as vital a part of the coal picture as production. Coal's future is as big and meaningful as that of other industries, but in bringing it along facts must be faced. Cooperative action is vitally necessary. If you help your competitor make money, you will make money yourself. Lauding NCA as a voice and instrument, Mr. Foulger urged affiliation with and active participation in local and national organizations.

Discussing prices, Mr. Foulger observed that if costs are out of line, prices will have to be out of line also, and competition is impossible. He called for a new approach to the problems of labor relations and contract negotiation as a means of eliminating unfair burdens on costs and prices. It can be done if all operators work together.

In spite of the fact that coal's future is big, it still has problems, and Mr. Foulger warned against tending to be frightened as a result of considering them all together in one lump. Handle them one at a time, and, with the aid of the associations, and with realism in pricing, they can be solved.

Discussion following the panel presentation brought out, among others, these points:

Handicaps in fighting natural-gas and oil expansion and importation include insufficient support from industry and from railroads, though certain carriers are quite active; also the argument that impact restriction would violate trade agreements.

The Hunt and Stringfellow bills are not dead but the death of Senator Hunt has increased the difficulty of getting favorable action. However, there is still hope.

The small operator is welcomed in NCA and other associations, since it is not so much size as cohesion and political influence that are important.

More financial support to associations would increase their effectiveness.

Certain decisions in natural-gas pipeline cases are really invitations to coal users to take gas and thus are even more unfair than normal.

It is difficult to assess the effect of the Seaway on coal's markets, but some effect can be expected. With residual imports, however, there is a direct and measurable effect not only on the coast but in the interior as a result of backing up of domestic residual.

It hurts to see heavy investments in equipment to reduce cost nullified by excessive and unwarranted price reductions.

Coal might take a lesson from the pattern of unified action and pricing in the oil industry.

BUILDING WITH RESEARCH

What market and product research can do to build coal markets was the theme of a presentation by Dr. Harold J. Rose, vice president and director of research, Bituminous Coal Research, Inc., at the final session, with Mr. Kastler presiding. Pointing out that coal has done a good production job, Dr. Rose observed, however, that its marketing job has not been as good, and that competitors will continue to gain unless coal meets competition with research, engineering sales and promotion comparable to that offered by competition. In fact, the dominant marketing weapons of the fastest-growing industries are research and engineering sales, and the competitive fuel producers spend $125,000,000 a year on research. Research is insurance to protect markets and spark expansion.

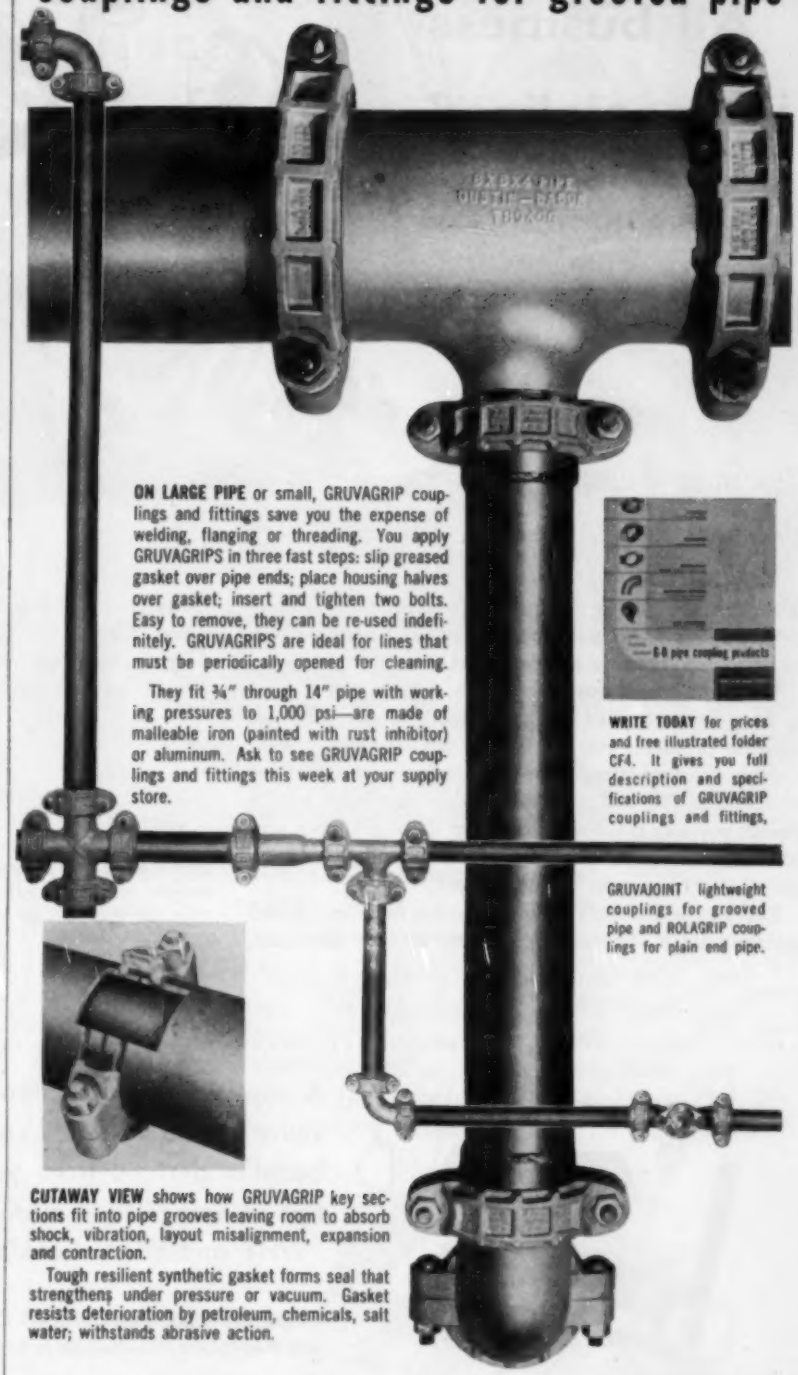
Briefing the BCR program in mining, market and technical research, Dr. Rose discussed the development of the BCR miner, face illumination, roof-bolt tension indicator and stainless-steel conveyor belts, and noted that unless new funds were forthcoming the program would have to be curtailed after September.

On market research, Dr. Rose observed that it must precede or accompany technical research. BCR projects in this field include the possibilities of electric-furnace production of low-carbon steel, with a potential market of 25 million tons a year; railroad electrification, the gas-turbine locomotive, overfire air jets, spray-type dust collectors, the automatic steam generator to combat packaged oil and gas plants, the Fire Jet stoker, dust reduction with the spreader stoker, BCR crop drier, heat for poultry brooder houses, design of homes for coal and coke, BCR smokeless magazine furnace, assistance in development of the Campbell stoker, flyash utilization, uses for pulverized coal, as in battery boxes; gas-producer development, and development of technical reports and publications on coal uses and possibilities, all looking to wider and better uses of coal by fuel customers.

The coal industry, Dr. Rose concluded, controls the Nation's most basic and valuable resource, and a corresponding opportunity for planned work to protect and build the market through research and engineering sales. At the usual rate of appropriation for research in industry, coal, on the basis of a $5 price, should be contributing 10c a ton for research. Actually, BCR has available less than 1/50 of 1% of gross income. "The future of coal is in its own hands."

GRUVAGRIP

couplings and fittings for grooved pipe



ON LARGE PIPE or small, GRUVAGRIP couplings and fittings save you the expense of welding, flanging or threading. You apply GRUVAGRIPS in three fast steps: slip greased gasket over pipe ends; place housing halves over gasket; insert and tighten two bolts. Easy to remove, they can be re-used indefinitely. GRUVAGRIPS are ideal for lines that must be periodically opened for cleaning.

They fit ¾" through 14" pipe with working pressures to 1,000 psi—are made of malleable iron (painted with rust inhibitor) or aluminum. Ask to see GRUVAGRIP couplings and fittings this week at your supply store.

WRITE TODAY for prices and free illustrated folder CF4. It gives you full description and specifications of GRUVAGRIP couplings and fittings,

GRUVAJOINT lightweight couplings for grooved pipe and ROLAGRIP couplings for plain end pipe.

CUTAWAY VIEW shows how GRUVAGRIP key sections fit into pipe grooves leaving room to absorb shock, vibration, layout misalignment, expansion and contraction.

Tough resilient synthetic gasket forms seal that strengthens under pressure or vacuum. Gasket resists deterioration by petroleum, chemicals, salt water; withstands abrasive action.

Gustin-Bacon Manufacturing Company

210 West Tenth Street Kansas City 6, Missouri

All business is specialized

... and nothing specializes on your business like your business paper

You can sell suntan lotion on Broadway or Beacon Street, but this seagoing salesman can sell a whale of a lot more . . . because he *specializes.*

Your business is specialized, too. That's why it pays to keep up with your business paper. It specializes on business problems you meet every day. It helps you do a whale of a lot better job by keeping you posted on your whole field. You can *move ahead* when you know what's ahead; you can make quicker, surer decisions when you have a clear perspective on what's happening; and you get all this from your business paper.

Every page counts. The editors gather facts, weigh and interpret them. The advertisers line up new products, materials and equipment . . . tell you what they do and where to buy them. To know what's new that's important to you, read *every* issue—thoroughly! It will keep you one of the best informed people in your field.

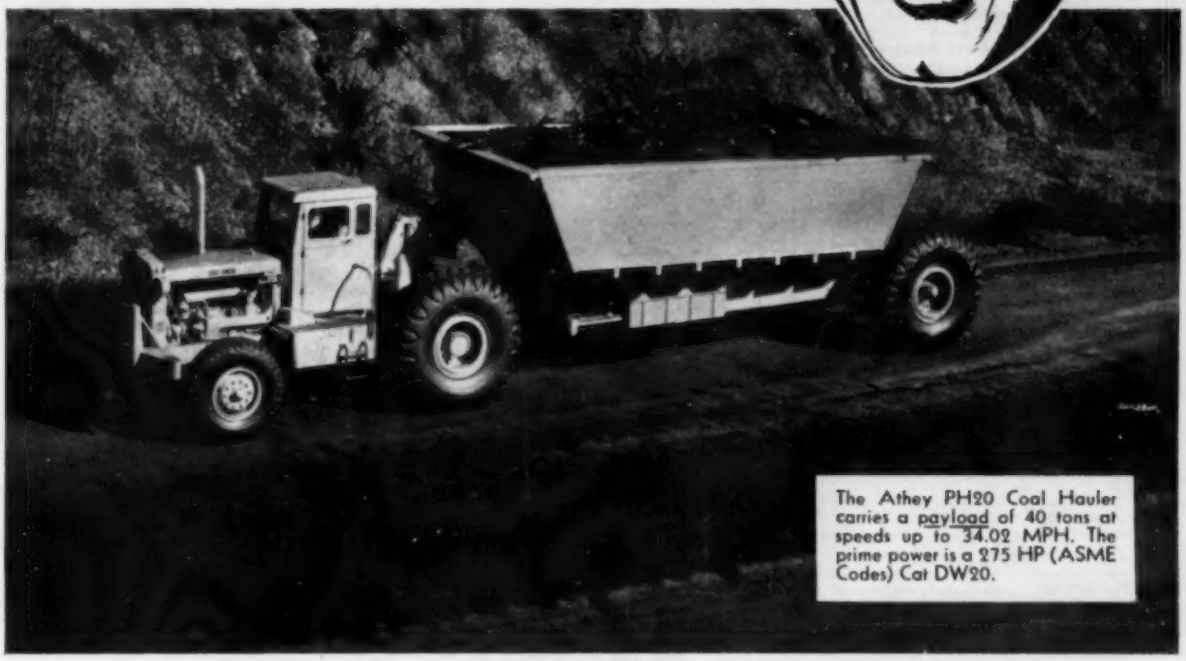
This business paper in your hand has a plus for you, because it's a member of the Associated Business Publications. It's a paid circulation paper that must earn its readership by its quality . . . And it's one of a leadership group of business papers that work together to add new values, new usefulness, new ways to make the time you give to your business paper still more profitable time.

A copy of this quick-reading, 8-page booklet is yours for the asking. It contains many facts on the benefits derived from your business paper and tips on how to read more profitably. Write for the "WHY and HOW booklet." Room 2710.

McGRAW-HILL PUBLISHING COMPANY
330 West 42nd St., New York 36, N. Y.

One of a series of advertisements prepared by THE ASSOCIATED BUSINESS PUBLICATIONS

"WOULD YOU HAUL 560,000 TONS FOR NOTHING?"



The Athey PH20 Coal Hauler carries a payload of 40 tons at speeds up to 34.02 MPH. The prime power is a 275 HP (ASME Codes) Cat DW20.

Your present 40-ton coal hauler is carrying 7 tons of useless dead-weight on each trip. If it averages four round trips each hour, during its 20,000 hour life, you will have hauled more than half a million tons—and you won't get a penny for them. You have extra costs for fuel, maintenance and tires that will be draining your profits.

Athey has eliminated this useless dead-weight in the PH20 Coal Hauler through the use of high-strength, premium alloy steels. For every pound of machine weight, you haul 1.6 pounds of *payload!*

Turn 7 tons of dead-weight into coal. Put an Athey PH20 Coal Hauler to work in *your* mine. Your Athey-Caterpillar Dealer has facts to back these figures . . . or you can get them by writing direct.

Athey PRODUCTS CORPORATION

5631 West 65th Street, Chicago 38, Illinois

CRUSHER ENGINEER

Well known national manufacturer with multi-plant mining, quarrying, and manufacturing operations, has opportunity for an engineer with experience with large rock quarrying and processing operations and with knowledge of various types of processing and handling equipment. Experience should include practical application to crushing, grinding, and beneficiation problems for the home office engineering department located in Chicago. Responsibilities will include investigation of problems through to their eventual conclusion. Position is permanent. In replying, please state age, education, experience, and salary desired.

P3248 Coal Age
520 N. Michigan Ave., Chicago 11, Ill.

WANTED

Assistant Superintendent in a combined Mechanical and Electrical Department of a long established underground mining operation in East Tennessee.

Successful applicant should have had several years experience in maintenance, and preferably, but not necessarily, be a technical graduate in Electrical Engineering.

Climate and living conditions are excellent. Give details of work experience, and include at least three references as to character and ability. Salary open.

P 3272 Coal Age
330 W. 42 St., New York 36, N. Y.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITION VACANT

ENGINEER—OLD established engineering firm needs man thoroughly experienced and qualified in coal preparation, plan layout and design of coal washing plants. State references, experience and salary. P-3302, Coal Age.

SELLING OPPORTUNITY WANTED

EXPERIENCED SALES engineer with following in southern West Virginia desires major line, preferably on commission or as manufacturers agent. Box RA-3395, Coal Age.

BUSINESS OPPORTUNITIES

Strip Coal Wanted

Lease or purchase—large or small tracts, Morgan Coal Company, 2850 North Meridian Street, Indianapolis 8, Indiana.

ROTARY DRILLING bit. Inventor of an improved rotary drilling bit of considerable merit wishes to contact manufacturer to produce under licence. Box BO-3274, Coal Age.

WANTED

WANTED
3-track Steel Tipple

100 to 125 tons hourly capacity with or without washer. Must be in good condition.

W-3437—Coal Age
330 W. 42 St. New York 36, N .Y.

SEARCHLIGHT SECTION

(Classified Advertising)

EMPLOYMENT: BUSINESS: **"OPPORTUNITIES"** :EQUIPMENT :USED OR RESALE

RATES

UNDISPLAYED	DISPLAYED
$1.20 a line. Minimum 3 lines. To figure advance payment count 5 average words as a line.	Individual Spaces with border rules for prominent display of advertisements.
Positions Wanted undisplayed advertising rate is one-half of above rate, payable in advance.	The advertising rate is $10.20 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.
Box Numbers Count as one line.	An advertising inch is measured ⅞" vertically on one column, 3 columns—30 inches—to a page.
Discount of 10% if full payment is made in advance for 4 consecutive insertions.	

NEW ADVERTISEMENTS: Address N.Y. office, 330 W. 42 St., N.Y. 36, for Sept. issue, Closing Aug. 17th

Practically new $25,000.00—15-ton Goodman Locomotive for only $8500.00, specifications as follow:

1—15-ton Goodman Locomotive, Ser. No. 5583
Two (2) Motors, Type 81-A-04-C, 120 HP each, 250 V DC
Contactor Controller Type LM98E

Wheel base	72"
Overall height	43"
Width overall	62"
Overall length	16'
Inside steel tired wheels	33"
Outside armorplate frame	4"
Track gauge	42"

Timken roller journal bearings
Equipped with HYDRAULIC BRAKES and CONTACTOR CONTROLS, equalizers, gear cases, brand new steel strip resistances, and one extra brand new armature.

300—Sanford-Day, 42" gauge, all steel Rotary Dump Mine Cars, 14" Timken bearing wheels, height from rail 40", outside length 12', width outside bed 6', length overall including semi-automatic couplings 14', level full capacity 4 tons. Cost new in 1948—$900.00 each. Bargain for only $225.00 each. In practically new condition.

1—Roberts & Schaefer Rotary Mine Car Dump, push button controls, with 2 5-10 HP Westinghouse variable speed motors, 3 phase, 60 cycle, 440 V.

212—Practically new 7-ton American Car & Foundry Company all steel 1-2-3 Drop Bottom Mine Cars

Track gauge	48"
Overall length	14'
Overall width	7'
Overall height on loading ends	40"
Overall height	48"
Axles	3½"

Timken roller bearing CAST STEEL wheels 16"
Heavy steel sides and heavy construction throughout.
Cost new in 1950 approximately $1280.00 each. Bargain for only $325.00 each.

Above equipment offered subject to immediate inspection and prior sale.

Many late type 8BU, 14BU, and 11BU, 250 V DC, permissible type Joy Loading Machines and 6SC, 5SC, and 42E Shuttle Cars.

Several Single and Double Drum Slope, Drift and Shaft Hoists with 300 HP to 1300 HP motors. Coal Washers, Bradford Breakers, complete 4 and 5-track Steel Tipples and many other items too numerous to mention. Send us your inquiries and get our low prices on any items you may need.

COAL MINE EQUIPMENT SALES COMPANY

Frank J. Wolfe **Phone L. D. 34** **Sheldon J. Wolfe**
Terre Haute, Indiana

FOR SALE
MINING MACHINERY COMPANY

1 DORR CLARIFIER THICKENER, 80' diameter, 12' high, steel tank on concrete base, will sell with or without pumps.

1 350 hp WESTINGHOUSE TYPE CW MOTOR, 450 rpm, 2200 volts primary and secondary panels, with resistances and reversing controller available.

A. R. CHAMBERLIN
MINING MACHINERY COMPANY
BLOOMSBURG R. D. 3, PENNA.

MAKE US AN OFFER

1—Goodman 712 Topcutter—AC
1—Myers Whaley Automat Loader No. 3 Serial 433 with set of armored belts

PEERLESS COAL, INC.
Newhouse Building, Salt Lake City, Utah

WORLD'S LARGEST INVENTORY

FREE CATALOG

MOTORS-GENERATORS-TRANSFORMERS
New and Guaranteed Rebuilt
1 H.P. to 2500 H.P.

ELECTRIC EQUIPMENT CO.
P. O. BOX 51, ROCHESTER 1, N.Y.

Ironton Electric Locomotives
New and used.
The Ironton Engine Company
Farmingdale, New Jersey

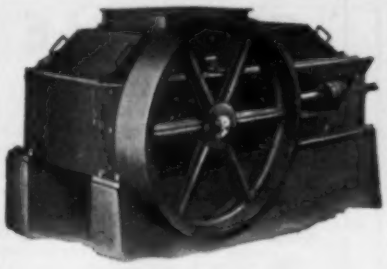
RAILS-TIES
TRACK ACCESSORIES
NEW and RELAYING

B-Monighan Walking draglines, 9W, 7W, 5W, 3W.
Page 10-yd. diesel Walking dragline, 152' bm.
Plymouth 35-ton gas locomotive, std. gauge.
Power shovels, 1½ to 22 yds., elec., diesel.
Bucyrus 42-T blast hole drills, 9" bits, elec.
Rotary dryers, kilns, 8x125, 7x125, 54"x40'.
Euclid 25-ton bottom dump coal haulers (3).
Whirley portal gantry cranes, 35-50 tons cap.

H. Y. SMITH CO.
828 N. Broadway Milwaukee 2, Wis.

RELAYING RAIL
All Sizes
Track Accessories

LEFTON INDUSTRIAL CORP.
***General Office:* 212 Victor Street**
St. Louis 4, Missouri



COAL CRUSHERS

1—18" x 18" Jeffrey single roll
1—24" x 24" Jeffrey single roll
1—24" x 36" McNally-Pittsburg double roll
1—36" x 42" double roll
1—30" x 16" Williams pulverizer
1—36" x 48" Jeffrey hammermill

TUGGER & SLUSHER HOISTS

1—5 HP Brownie room hoist
1—5 HP Sullivan RH room hoist
1—7½ HP Sullivan double drum slusher hoist
2—10 HP Sullivan 3 drum slusher hoist
1—Ingersoll-Rand mod. 6HC air tugger hoist
2—6½ HP Sullivan tuggers, 250 v. DC
7—6¼ HP Sullivan double drum, 250 v. DC
1—10 HP Sullivan double drum driven by Continental gasoline engine

BOX CAR LOADERS

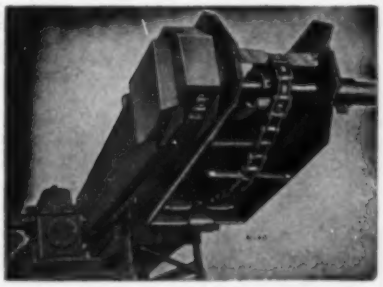
3—Ottumwa 20 HP box car loaders
2—Manierre 22 HP box car loaders
1—Jeffrey 20 HP box car loader
2—Red Devil portable loaders, 12'x15"
1—Card portable loader, 11'x19"

SCRAPER CONVEYORS

1—Link Belt, 50' centers, 12" flights
1—Jeffrey, 75' centers, 9" flights
1—Jeffrey, 67' centers, 30" flights
1—Jeffrey, 70' centers, 30" flights
1—Jeffrey, 72' centers, 30" flights
1—Jeffrey, 88' centers, 36" flights
1—Jeffrey drag, 28' centers, 9" drags
1—Jeffrey drag, 26' centers, 30" drags

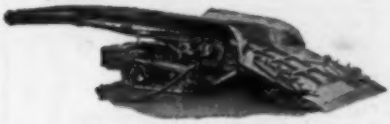
ROTARY DUMPER

1—Card rotary car dumper, 13'x5' platform



ELECTRIC HOISTS

1—11 HP Vulcan #0 single drum
1—20 HP Vulcan single drum
1—22 HP Vulcan double drum
1—25 HP Vulcan single drum
1—30 HP Vulcan single drum
1—37 HP single drum
5—50 HP single drum
2—60 HP single drum
4—100 HP Box single drum
1—112 HP Vulcan single drum
1—145 HP Vulcan single drum
2—150 HP Vulcan single drum
1—375 HP Box Single Drum Hoist, 800 FPM with 375 HP GE Slipring Motor, 575 RPM, complete with controller, grids and magnetic contact panel.
1—600 HP Box Single Drum Hoist, 25,000# Rope Pull, 900 FPM, Hydraulic Post Breaks with 600 HP Westinghouse Slipring Motor, 435 RPM, controls and magnetic contact panel.



LOADERS & CONVEYORS

1—88U Joy loader
1—61EW Jeffrey elevating chain conveyors
1—61HG Jeffrey chain conveyor, 90'
1—61W Jeffrey chain conveyor, 200'
9—G-20 Goodman shaker conveyors
6—G-15 Goodman shaker conveyors
8—Vulcan shaker conveyors
2—Joy ladel UN-17 shaker conveyors
10—Goodman HA duckbills

MINING MACHINES

2—7B Sullivan super short wall coal cutters
18—CE7 Sullivan coal cutters
1—CR3 Sullivan coal cutter
1—Jeffrey 28A coal cutter
6—Goodman 112-A coal cutter
1—Sullivan CH-11 ironclad shearing machine
1—Jeffrey 29-C Arcwall coal cutter

SCALES

3—100 ton Fairbanks railroad scales
1—100 ton Howe railroad scale
1—125 ton Howe railroad scale
1—5000# Fairbanks Tipple scale with weighing basket
1—5000# Howe Tipple scale

SCREENS

5—3'x5' Tyler "Hummer" electric vibrating screen
1—42"x72" Jeffrey-Traylor electric vibrating screen
1—48"x84" Jeffrey-Traylor electric vibrating screen
1—40"x100" Tyler-Niagara 2 deck shaking screen
2—4'x12' Tyler Ty-rock 3 deck shaking screen
1—2 deck shaking screen, 18'x86"
1—4 deck shaking screen, 32'x84"

PIT CARS

125—60 cu. ft. Card steel coal mine cars 36" ga.
88—66 cu. ft. Card steel coal mine cars 36" ga.

SHUTTLE CARS

2—Joy Shuttle Cars, Model 42D5.

RAIL

We have in stock good relaying rail, 16# to 90# also new 16# to 20# with fittings.

STORAGE BINS

2—50 ton capacity steel bins

CAGES AND HEAD SHEAVES

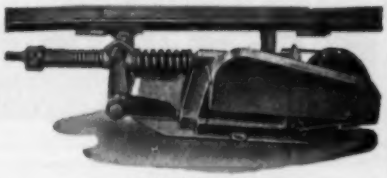
2—Card automatic self-dumping cages, 5'4" x 9'6" platform
2—108" Card bicycle sheave wheels
2—96" wood filled sheaves
2—84" Card bicycle sheave wheels
3—72" bicycle sheave wheels

MINE FANS & BLOWERS

2—8-H Jeffrey 42" Aerodyne fans
1—7' Jeffrey Aerovane 2 stage fan
2—Jeffrey #61 exhaust blowers
7—Jeffrey Aerodyne midget blowers
1—2600 cfm Brown-Fayro exhaust blower
2—3000 cfm Claridge exhaust blowers

PICKING TABLES

1—Link-Belt, 20' centers, 18" pans
1—Card, 41'6" centers, 30" pans
1—Card, 51' centers, 48" pans
1—73' centers, 30" pans
1—64' centers, 48" pans



ELEVATORS

1—Link-Belt, 42' centers, 6"x4" buckets, single chain, complete with steel housing
1—Link-Belt, 36' centers, 18"x8" buckets, double chain
1—12' centers, 14"x7" buckets on belt
1—35' centers, 10"x5" buckets on belt

BELT CONVEYORS

1—Jeffrey 24"x13'
1—Barber-Greene, 24"x66'
1—Barber-Greene, 24"x135'
1—Barber-Grene, 30"x173'

LOCOMOTIVES

1—2 ton Whitcomb, battery, 24" ga.
2—2½-3½ ton Mancha battery, 24" ga.
1—4 ton Westinghouse-Baldwin battery, 24" ga.
1—4 ton Ironton, battery, 36" ga.
2—7 ton G.E. permissible battery, 36" ga.
1—7 ton Atlas, battery, 36" ga.
3—8 ton Ironton battery, 36" ga.
2—8 ton G.E. battery, 36" ga.
2—8 ton Goodman battery, 36" ga.
4—10 ton Atlas battery, 36" ga.
1—3 ton Whitcomb gas engine driven, 24" ga.
1—2½ ton Jeffrey trolley, 36" ga.
1—4½ ton Goodman trolley, 36" ga.
1—5 ton Jeffrey trolley, 36" ga.
1—6 ton Goodman trolley, 36" ga.

Send for free copy of illustrated booklet describing the famous Allen Lamp collection.

Since 1898 Dependable Reconditioned Machinery

MORSE BROS. MACHINERY CO.

2900 BRIGHTON BLVD. EST. 1898 DENVER 1, COLO.

THE STORY BEHIND A FAMOUS PROMISE

We have often published this statement: "J. T. FISH is always open to buy." We are able to live up to this pledge because we operate a diversified, large volume business on a small margin of profit.
Just as we guarantee an unfailing source of mining equipment and supplies at bargain prices to our customers we guarantee fair prices for whatever you have to offer.
We Own What We Advertise.
All types of Joy Cutters, Loaders, Shuttle Cars, Cat Trucks, Belt Conveyors, Chain Conveyors, etc. Includes

1—Jeffrey 29U rubber tired Cutter.
1—Joy Continuous Miner, low vein.
2—14 BU low pedestal Loaders, 10 H.P. motors, type 7AE.
2—14 BU, med. pedestal Loaders, 10 H.P. motors, 7 RBE.
2—14 BU, 3PE, med. pedestal Loaders, 7½ H.P. motors.
1—12 BU, 9E latest type Loader.
2—8 BU Loaders, one 33½" high.
2—11 BU Joy Loaders, hi capacity.
2—Joy T2-5 Cat Trucks, low pan. 1—T2-6.
1—Joy T1 Standard Cat Truck.
2—Joy 30" Belt Conveyors, 1000' & 2000' centers. Like new.
2—Joy 11B low vein Cutting Machines 35 and 50 H.P.
2—Joy 6 SC four wheel drive Shuttle Cars., rebuilt. Elevated discharge.
2—Joy 5SC four wheel drive Shuttle Cars.
4—32E15 Shuttle Cars, all hydraulic.
4—42E Shuttle Cars, as is or rebuilt.
10—32E9 Shuttle Cars, as is or rebuilt.
2—Joy PL11-14 Elevating Conveyors, rebuilt.
2—Joy Belt Feeders PL12.
3—Myers Whaley No. 3 Automat Loaders.
Jeffrey L-500 Loaders.
Goodman 360 Loaders.
Cedar Rapids portable 3 track tipple complete with Conveyors. Like new.
General Electric & Westinghouse Rotary Converters, 100 to 300 KW. Latest type.
4—G.M.C. & Caterpillar 75 and 100 KW Diesel Plants, 250 DC volts.
6—Goodman 512EJ Cutting Machines.
3—Baby Goodman 212AA Cutting Machines.
8—Jeffrey 35L, 35B, 29C, 29L Cutters.
Locomotives of all types in stock.
4—Brown Fayro HKL Car Spotters.
2—HGD Hoists, Brown Fayro.
3—MSA Rock Dusters, latest.
Incline Hoists, all types.
Mine Cars, end dump & drop bottom, 42", 44" & 48" track gauge.
Car Retarders—Boom Hoists.
1000 G.I. 5 Gal. Gas & Water Cans.
New Hydraulic Tow Trucks, pneu. tires.
Transformers, all sizes & voltages.
Joy and Jeffrey 12" & 15" Chain Conveyors.
Shaker Conveyors, Goodman & Joy.
Crushers and Vibrators.
Conveyor Belting 26" and 30" for all purposes.
16 Yd. Dragline Bucket.
Hardscog Horizontal Drill.
Quickway Truck crane and Shovel.
PGH ½ Yd. Crawler Shovel.
Copper Trolley & Feeder Wire, all types.
Relaying Rail, all sizes.
Mine Scales and Truck Scales.
Electric Welders.
Stationary Motors, AC and DC.
300 H.P. Natural Gas Engine.
Alternator 2300 volt, 200 KW.

Thousands of other Items

We Buy — Sell — Trade *Send Us Your Inquiries*

J. T. FISH & COMPANY
LOGAN, WEST VIRGINIA . . . PHONE — 2825

FOR SALE

PORTABLE LIGHTING PLANTS

(Gasoline Driven)

(10) 3000 watts—portable—gasoline driven—115 volts AC 60 cycle single phase. Manual starting, driven by 2 cyl. 4 cycle radiator cooled engine with 3" bore—2½" stroke—1800 rpm. Suitable for use on dragline—contractors tools—lighting.

(1) NEW portable 5 KW gasoline driven generator set. Hercules engine—4 cyl.—30 HP—radiator cooled—electric starting—marine enclosure. GENERATOR: Schramm 5 KW 110 volts DC 45.5 amps.—1750 rpm—serial No. 86N228—Model 5HCD.

DIESEL GENERATOR SETS

(1) 75 KW WAUKESHA totally enclosed diesel generator set—230 volts—231 amps—ENGINE: 160 HP—Model WAKH—1200 rpm—built-in switchgear and self-contained radiator.

(1) 25 KW—31.3 KVA BUDA diesel generator sets — self-contained. ENGINE: BUDA model 6DTG-468—4½" x 5½"—1200 rpm—radiator cooled. GENERATOR: G.E. 120/208 volts — 3 phase — 60 cycle — 87 amps. — 40 rise — 0.8 P.F. With self-contained switchgear — direct connected exciter. Low hours.

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200 KW G.E. 275 v. 1200-MPC-ATI 2300/4000 v.
200 KW Ridg. 275 v. 900R-Syn. 2300 v.
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1—24 x 24 Jeffrey Single Roll.
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1—24 x 24 Webster Single Roll.
1—24 x 20 Jeffrey Flextooth
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1—#60 American Pulveriser Ring Roll Crusher.
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7—11BU Joy Loaders, Type 10APE, 250 Volts, DC.
1—8BU-11E Joy Loader, 250 Volts, DC.
2—8BE Joy Loaders, 220 Volts, AC.

LOCOMOTIVES

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1—10-ton Jeffrey MH110, Ball Bearing Motors, 42" gauge.
1—10-ton Jeffrey, Type MH143, Ball Bearing Motors, Ball Bearing Journals, 42" gauge.
1—10-ton Goodman, Type 29A04C, Ball Bearing Motors, 42" gauge.
8—6-ton Greenburg Monitor Battery Locomotives, built in 1946, 42" gauge, complete with batteries.
50—Locomotives ranging from 5 ton up to 20 ton in gauges from 36" to 42".

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3—512DJ3A Goodman, 220/440 Volts, AC, 8½' cutter bars.
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1—13AA Goodman, 250 Volts, DC, 6' cutter bar.

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1—300KW Ridgeway, 2200 Volts, AC, 275 Volts, DC, 1200 RPM, Manual Switchboard.
2—250 KW Allis-Chalmers, 2300 Volts, AC, 275 Volts, DC, 1200 RPM, complete with automatic reclosing circuit breaker and manual starter.
2—200 KW General Electric, 2300 Volts, AC, 275 Volts, DC, 1200 RPM, complete with automatic reclosing circuit breakers and automatic starters.
1—200 KW Westinghouse, 2300 Volts, AC, 275 Volts, DC, 900 RPM with automatic circuit breaker and manual starter.
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ROTARY CONVERTERS

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1—29U Jeffrey Cutting Machine, Track/mtd. Serial #21895
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COAL AGE ADVERTISERS IN THIS ISSUE

MORE INFORMATION on any product advertised in COAL AGE may be easily secured by using the postage-free card facing p. 113.

Acme Machinery Co. 155
Alemite Div., Stewart-Warner Corp. 42
Allis-Chalmers Tractor Div. 141
Allis-Chalmers Mfg. Co. 9, 35
American Car & Foundry Industries, Corp. ..... Second Cover
American Cyanamid Co., Expl. Dept. ..... Insert between pp. 36–37
American Mine Door Co. 139
American Oil Co. 51
American Pulverizer Co. 22
American Steel & Wire Div. 16, 20, 147
Anaconda Wire & Cable Co. 123
Armco Drainage & Metal Products, Inc. 154
Armstrong-Bray & Co. 138
Atlas Powder Co. 48
Athey Products Corp. 171

Barber-Greene Co. 140
Bethlehem Steel Co. 10–11, 34
Bird Machine Co. 4
Bonnot Co. 132
Bowdil Co. 149
Broderick & Bascom Rope Co. 157
Bucyrus-Erie Co. 121, 133
Builders-Providence Div. of B. I. F. Industries, Inc. 146

Carboloy Dept. of General Electric Co. 30–31
Cardox Corp. 145
Caterpillar Tractor Co. 112, 180
Chevrolet Div. of General Motors Corp. 109
Cities Service Oil Co. 119
Coal Operators Casualty Co. 162
Coffing Hoist Co. 138
Collyer Insulated Wire Co. 160
Colorado Fuel and Iron Corp. 143
Colorado Iron Works Co. 36A
Columbia-Geneva Steel Div. 16, 20, 147
Combustion Engineering, Inc., Raymond Div. 163
Cummins Engine Co. 32–33

Deister Concentrator Co. 137
Detroit Diesel Engine Div., General Motors 135
Dorr Co. 158
duPont de Nemours & Co., E. I., Textile Fibers Dept. 36
duPont de Nemours & Co., E. I., Rubber Chemicals Div. 27

Eaton Mfg. Co. 26
Elmco Corp. 17
Ensign-Bickford Co. 52
Euclid Div., General Motors 153

Fairmont Machinery Co. 113
Firth Sterling, Inc. 107
Fletcher & Co., J. H. 139
Flood City Brass & Electric Co. 134

General Cable Corp. 151
General Electric Co. 46–47
General Electric Co., Construction Materials Div. 101
Goodman Mfg. Co. 13
Goodrich Co., B. F. 1
Goodyear Tire & Rubber Co. 21
Gundlach Machine Co., T. J. 162
Gustin-Bacon Mfg. Co. 169
Guyan Machinery Co. 148, 164

Hannon & Sons, F. R. 140
Hazard Insulated Wire Works, Div. of the Okonite Co. 117
Heil Co. 166
Hendrick Mfg. Co. 144
Hulburt Oil & Grease Co. 2–3

International Harvester Co. 127

Jeffrey Mfg. Co. 18–19
Johns-Manville 106
Jones & Laughlin Steel Corp. 43, 136
Joy Mfg. Co. 39, 40–41

Kennametal, Inc. 91
Kersey Mfg. Co. 150

LeRoi Co., Transo Div. 99
Lee-Norse Co. 110
Link-Belt Co. ..... 179, Fourth Cover
Long Co. 103

Marion Power Shovel Co. 50
Merrick Scale Co. 134
Mine Safety Appliances Co. 28–29

National Tube Div. 16, 147
Neff & Fry Co. 164
Nolan Co. 148
Nordberg Mfg. Co. 38

Ohio Brass Co. 131
Oliver United Filters, Inc. 44–45
Osmose Wood Preserving Co. of America 108

Paris Mfg. Co. 179
Pennsylvania Drilling Co. 139
Post-Glover Electric Co. 156

Republic Steel Corp., Bolt & Nut Div. 161
Roebling's Sons Co., John A. 49
Rollway Bearing Co. 167
Ruberoid Co. 152

Salem Tool Co. 139
Sanford Day Iron Works 8
Scandinavia Belting Co. 114
Schroeder Bros. 142
Searchlight Section 172–176
Simplex Wire & Cable Co. 15
Socony-Vacuum Oil Co. 97
Sprague & Henwood, Inc. 146
Spang & Co. 150
Stamler Co., W. R. 144
Standard Oil Co. (Indiana) 23

Tennessee Coal & Iron Div. 16, 20, 147
Texas Co. 6–7
Timken Roller Bearing Co. 37

United States Rubber Co., Electrical Wire & Cable Dept. 93
United States Rubber Co., Mechanical Goods Div. ..... Third Cover
United States Rubber Co., Tire Div. 14
United States Steel Corp. 16, 20, 147
United States Steel Export Co. 16, 20, 147
United States Steel Supply Div. 16, 147

Wellman Engrg. Co. 165
West Virginia Steel & Mfg. Co. 168
Western Machinery Co. 95
Westinghouse Electric Corp., ... 24–25 & Insert between pp. 105–106
Wickwire Spencer Steel Div. Colorado Fuel and Iron Corp. 143
Wilfley & Sons, Inc., A. R. 111

Youngstown Sheet & Tube Co. 12

PROFESSIONAL SERVICES 176

SEARCHLIGHT SECTION

(Classified Advertising)

H. E. Hilty, Mgr.

EMPLOYMENT
Positions Vacant 172
Positions Wanted 172
Selling Opportunities Wanted 172

BUSINESS OPPORTUNITIES
Offered 172

EQUIPMENT
(Used or Surplus New)
For Sale 174–175

WANTED
Equipment 174

ADVERTISERS INDEX

Albert Pipe Supply Co., Inc. 175
Boston Metals Co. 174
Chamberlain, A. R. 172
Coal Mine Equipment Sales Co. 172
Compass Coal Co. 175
Electric Equipment Co. 172
Electric Service Co., Inc. 174
Farland Fuel Co. 175
Fish & Co., J. T. 174
Gavenda Brothers, Inc. 175
Greensburg Machine Co. 174
Hillman Coal & Coke Co. 174
Ironton Engine Co. 172
Lefton Industrial Co. 172
Mining Machinery Co. 172
Moorhead Electrical Machinery Co. 174
Morse Bros. Machy. Co. 173
Peerless Coal, Inc. 172
Schoonmaker Co., Inc., A. G. 174
Smith Co., H. Y. 172

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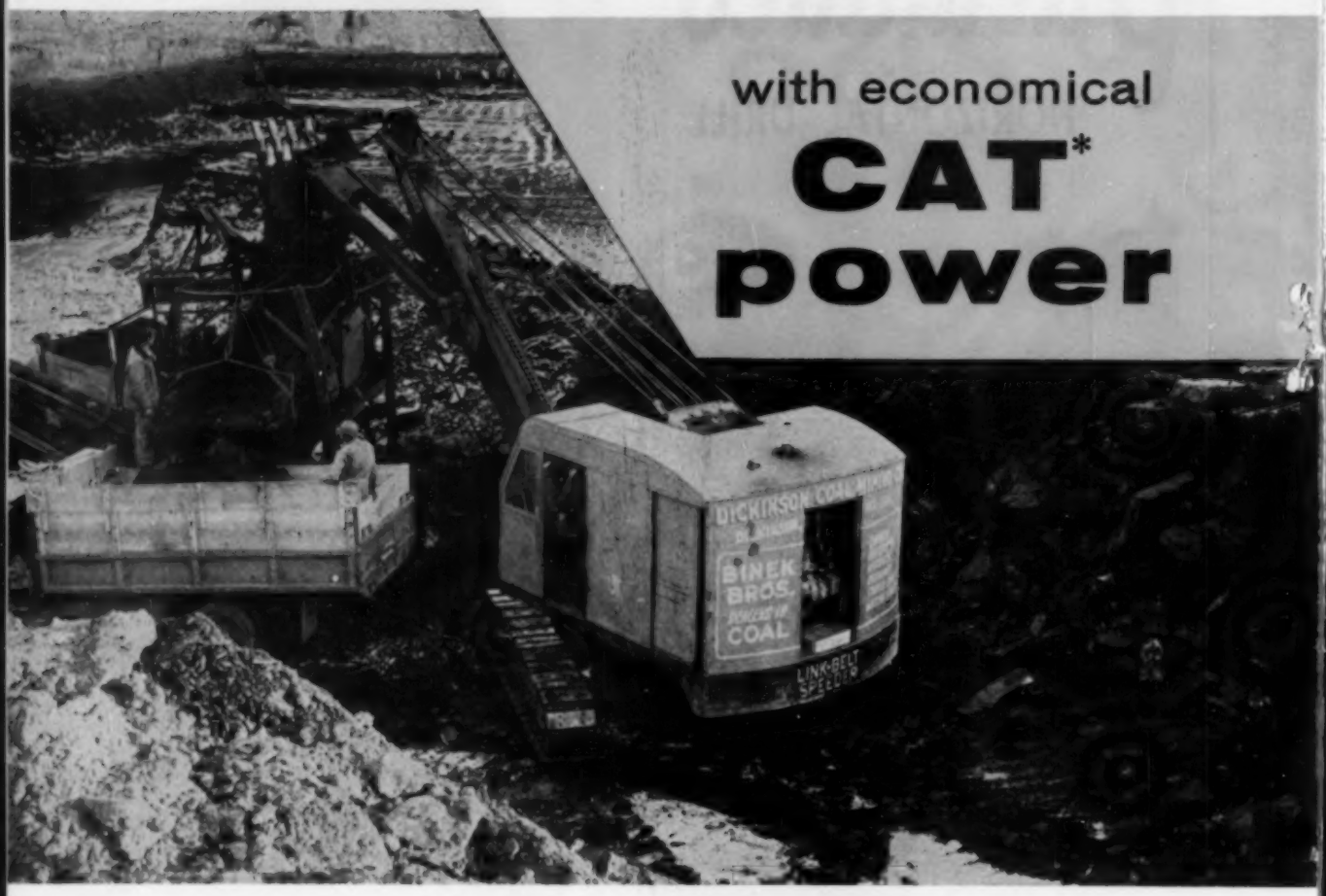
Small shovel handles 700 tons a day



Powered by a Caterpillar D8800, this ¾-yd. Link-Belt Speeder loads up to 700 tons a day into the portable hopper. It has also loaded as many as 172 four-ton trucks a day with lignite coal, screenings and stoker coal. The dependable Cat Diesel has more than 7300 hours on the meter, working eight months of the year for Dickinson Coal Mining Co., Dickinson, North Dakota. Stoker and oversize coal from the nine-foot vein are sold to the rural market in this section of western North Dakota.

The company also has five Caterpillar track-type Tractors and two Scrapers. Edward A. Binek, the owner, says, "Caterpillar equipment has really given us good service." He especially likes the easy starting of his Caterpillar Engines in the severe North Dakota climate.

This D8800 operates for pennies per hour on low-cost No. 2 furnace oil. Like all Cat Diesels, it is built to deliver full and *foul-free* power on non-premium fuel, thanks to its exclusive, Caterpillar-built fuel injection system. Also cutting costs for its owner are such features as specially hardened crankshaft journals and long-lived aluminum alloy bearings. They mean less down time, fewer overhauls, longer engine work life.

There are 12 honestly rated Caterpillar Engines up to 500 HP, and Electric Sets up to 315 KW. Your Caterpillar Dealer—who provides dependable service and genuine factory parts—will help you select the engine that will do most work for you at lowest cost. See him when you repower. And when you order new equipment, remember that leading manufacturers can supply Caterpillar power in their excavators and other mining machinery.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

SPECIFY CAT POWER FOR HIGH-PROFIT PRODUCTION

U.S. Rubber belting "takes its lumps" and likes it!

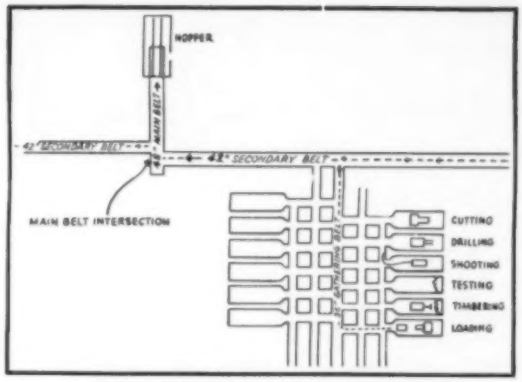
SECTION OF U.S. GIANT® Underground coal belt serving as main haulage belt (below). Coal being loaded from 36" U.S. Giant gathering belt onto 42" U.S. Giant secondary haulage belt.

SCENE:—Mine No. 10 of the Peabody Coal Co., Illinois. Daily capacity, 12,000 tons. For haulage, belting is used exclusively.

PROBLEM: The use of compressed air to break down the coal invariably results in a high percentage of large lumps. The average belt can't take such a beating for long. What to do?

SOLUTION: United States Rubber Company engineers were called in to help in the pioneering and design of the world's most modern underground coal handling system. Using the famous "U.S." Three-way Engineering (in which "U.S." engineers work with the mine operators *and* the designers of the conveyor system) gathering belts, secondary haulage belts, transfer belt and main haulage belt—all made by "U.S."—were installed. These belts stand up easily under the constant battering of the large lumps. Troughability and proper training completely eliminate spillage even at peak loadings as high as 2400 tons per hour.

Take *any* conveyor belt problem—large or small—to "U.S." There are sales engineers at your service at any of our 25 District Sales Offices. "U.S." belting service is also obtainable from any of our selected distributors. Or write address below.



TYPICAL LAYOUT of a room territory and belt system that serves it.

"U.S." Research perfects it • "U.S." Production builds it
U.S. Industry depends on it

UNITED STATES RUBBER COMPANY

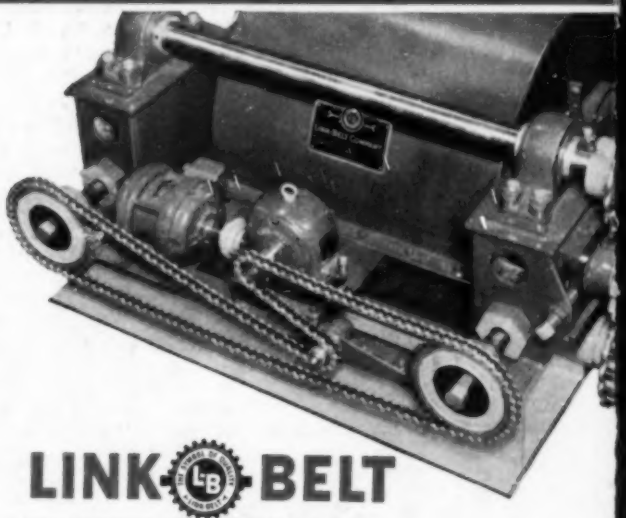
MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

Hose • Belting • Expansion Joints • Rubber-to-metal Products • Oil Field Specialties • Plastic Pipe and Fittings • Grinding Wheels • Packings • Tapes Molded and Extruded Rubber and Plastic Products • Protective Linings and Coatings • Conductive Rubber • Adhesives • Roll Coverings • Mats and Matting

HERE'S THE ANSWER

...to quick, easy product size changing

Choose either Link-Belt method for fast changes of product size—hand-operated worm gear (left) or push-button controlled motor drive.



LINK-BELT Type "C" Two-Roll Coal Crusher permits accurate adjustment for size

If fluctuating market requirements call for frequent changes of your product size, here's the coal crusher for you. With Link-Belt's Type "C" Two-Roll Coal Crusher, you can change roll settings fast . . . either manually or by push-button control.

Important, too — tooth-to-tooth impact of double rolls *cracks* the lumps, rather than crushing them. High capacity is assured, with minimum power and maintenance.

With the accurate roll adjustment obtainable in Link-Belt's Type "C" Crusher, the product contains a minimum of fines and oversize.

Like all Link-Belt coal preparation machinery, Link-Belt Coal Crushers are ruggedly built . . . have compiled impressive low-maintenance records under years of tough service. Let a Link-Belt engineer give you complete information. 12,798

LINK-BELT

COAL PREPARATION and HANDLING MACHINERY

LINK-BELT COMPANY: Chicago 9, Philadelphia 40, Pittsburgh 13, Wilkes-Barre, Huntington 9, W. Va., Louisville 2, Denver 2, Kansas City 8, Mo., Cleveland 15, Indianapolis 6, Detroit 4, Birmingham 3, St. Louis 1, Seattle 4, Salt Lake City 1, Toronto 8, Springs (South Africa), Sydney (Australia).